



SATURDAY, AUGUST 16, 1873.

CIVIL ENGINEERS' CLUB OF THE NORTHWEST.

Rapid Transit in Cities.

Read before the Civil Engineers' Club of the Northwest March 10, 1873, by T. J. Nicholl.

Among the most important engineering problems of the age, and one that is increasing in significance every day, as our cities become more thickly populated, is that of how to transport the people of our larger cities to and from their homes and places of business, at a much greater speed than that of the ordinary horse or street car and omnibus, enabling those who live several miles in the suburbs to reach their destination either way in about one-third the time now occupied. The solution of this problem is something in which the laborer, the business man and property owner are alike interested, as it will add immensely to the health, growth and prosperity of the cities, where a satisfactory method of rapid transit is secured, inasmuch as it will bring the suburbs into close communication with the business centers, removing in a great measure the necessity of those harbinger of filth and disease, "the tenement houses" [it is said that these supply fully sixty "per centum" of the annual deposits in our cemeteries], as neat, clean and detached homes could be rented at the outskirts, where rents are lower and property less valuable; then the space occupied formerly by the said "tenement houses" would be enhanced in value for business purposes. One has but to glance at the crowded main thoroughfares, the over-crowded street cars and other vehicles, before and after the working hours in any large city, to be convinced that "animal power," however applied, is wholly insufficient, both in speed, reliability, comfort and capacity, to meet the demands of the traveling public. Horse railroads proved particularly inadequate and unreliable during the late visitation of the "epizootic," and it is a fact worthy of some notice, that on the worst days of winter, when cars are most called for, these roads are generally blockaded and consequently business impaired.

Many other motors have been suggested, such as propelling endless cables, gravity, pneumatic force and steam. The first of these has been well tried, and so far found wanting, the objections against it being many. As to the second plan, it is at least feasible, but of very doubtful utility in city locomotion. The third may possibly be utilized at some future period, but at present is decidedly unpromising, both in regard to economy and application, as, for every pound of power obtained from "compressed air," the same amount of force must be expended in compressing it, and if that force is removed it will exhaust its strength very rapidly. Steam appears to be the only motive power that has secured universal approval, demonstrated by its continued use and resultant satisfaction. To the steam engine, then, we must look to supply the requisite power, which should be entirely inclosed, and made to consume its own smoke and steam. The wheels of such an engine should be constructed of some substance or combination of substances that would produce but little noise, and provided with extra deep flanges to prevent their leaving the track, on which the engines must necessarily work to be operated successfully.

It is obvious, then, that a steam railway is what our cities require to solve the problem of quick, frequent and steady transport of passengers, and to insure success it must be a double-track railway, as a single track, even with many sidings, or turnouts (aside from being more liable to accident), would be but little better than our present system in regard to capacity.

There are two positions for these roads to occupy advantageously—viz.: Elevated sufficiently above the surface of the streets and alleys to admit of all classes of vehicles passing under, or so far beneath the surface as not to impair the foundations of buildings, sewers, water-mains, gas-pipes, etc. There are many advantages in favor of the former, prominent among which are:

1st. They may be (although not necessarily) constructed over existing streets or avenues, thus utilizing more fully a space already set apart expressly for traffic.

2d. Their position allows the use of steel or iron in their construction, consequently they may be very light in cost and appearance, yet fully competent to bear with safety the desired load.

3d. Their cost can be estimated with accuracy.

4th. They need obstruct or affect the usual traffic but very little, either during construction or after completion, and are more easily and quickly erected.

The only advantage in favor of those under the surface is that they are out of the way, being neither seen nor heard; while on the other hand ventilation will at best be very imperfect.

2d. During construction they would materially interfere with business, especially if they should follow the course of a street; and

3d. Their cost is very large and cannot be estimated beyond a very uncertain approximation.

The distance would be about the same to reach either plan, being a matter of perhaps twenty feet up or down stairways, one in daylight, the other in darkness.

In any case it must be remembered that frequency in movement of trains is what is most desired; to accomplish which engines weighing from five to seven tons should be used, drawing say two or three suitable cars at the rate of ten or fifteen miles an hour, making frequent stops, instead of heavy

engines with enormous loads moving at long intervals, which are not adapted to afford the required relief, as their momentum will not admit of being checked as easily as the lighter trains, and cannot ascend any steeper gradient in proportion.

Having made these few preliminary remarks, I will state that it is not my intention to present any original design to solve the problem of "rapid transit in cities," but rather to submit for your consideration an abridged description of some of the plans proposed for the cities of London and New York, which are numerous enough to cover the whole field of operation under any circumstances, in any city. I shall, however, only dwell upon those of intrinsic merit, there being many that are simply ridiculous to any one having even a small knowledge of mechanics and general construction. Perhaps there has been no subject that has occupied the attention of so many men of eminent ability, and the contrary, as the one under consideration.

I will now proceed to place before you a brief description of those in actual operation in London.

The Metropolitan Underground Railway of London is situated on the north side of the river Thames, and consists of a main line with several branches. What may be termed the main line, and which will be sufficient to give us an idea of the whole system, will when completed form an irregular oval, commencing at the Tower, following up the river beneath the new "Thames Embankment" as far as the Houses of Parliament, thence inland to Kensington, curving north through Kensington by Pembroke square to Paddington, thence along the north side of the city, through the Marylebone road by King's Cross and Smithfield back through the city proper to the place of beginning, being in the neighborhood of fourteen miles long and touching at the principal railway depots in the city. It does not follow the streets, but cuts through the blocks in every direction, and generally passes beneath the gas and water pipes and sewers. The great Fleet-ditch, one of the largest sewers in London, is carried across in a wrought-iron duct resembling a tubular bridge, at one of the open cuttings near King's Cross.

As to construction, the road is for the most part in a tunnel, the open cuttings averaging less than one-third of the distance. The excavations are described as being mostly in clay, with occasional veins of sand and gravel.

The tunnel (fig. 1^a) is solidly built of brick in the shape of a "horseshoe," with an average width of twenty-eight feet, and is nowhere less than 1½ feet high. The foundations are laid in concrete, and the arches of arch carried up with same material to nearly the level of the crown, the whole top of tunnel and arches being covered with a layer of asphalt one and a half inches thick to render the arch waterproof, and any water that may collect thereon is carried by an earthen pipe 4 inches in diameter to the drain beneath the road-bed. The open cuttings average twenty-five feet in width and are generally about fifteen feet below the surface, the sides of which are kept in place by "retaining walls" (figs. 2 and 3) built up on a batter of about one inch to the foot to the surface, upon which are erected parapet walls nine feet in height, as shown. In some places these open cuts are covered, as in passing under a street or building, in which case the side projections P (fig. 3) are carried up to receive cast-iron girders (Nos. 1 and 2, fig. 4) on which arches of brick are built from one to another, and filled in with brickwork or concrete, over which lies the material and pavement of street. When passing close under buildings, wrought-iron girders are used, as shown in (fig. 4, Nos. 3 and 4.)

Double tracks are laid throughout, and trains run both ways every five minutes. The locomotives are small and compact, emitting neither smoke nor steam, and burn coke.

The carriages are lighted with gas and are built with compartments in the usual European style, with doors at the sides, allowing the rapid exit and entrance of passengers, which, notwithstanding their other faults, is a great consideration in their favor for rapid city transit. The ventilation of the tunnel is stated as being "very far from perfect" and "often oppressive," but it does not appear to affect the passengers or employees, although two persons died on this road in 1867, but in neither case did the coroner's inquest refer the cause directly to want of ventilation.

The gross cost of construction and right of way amounts to about \$2,900,000 per mile, in currency, and has proved a financial failure, although at one time supposed otherwise.

The Pneumatic Dispatch, of London, is worthy of notice, although it is not used for passengers. It is now completed from Euston to the General Post-Office, in two sections, of 3,080 yards and 1,658 yards in length respectively, the maximum gradient being one foot in fifteen, occurring on the short section. The tube is of horse-shoe cross section, being 4 feet 6 inches vertically and 4 feet wide at track. The cars or trucks, weighing about one ton, are 10 feet 4 inches long, their ends presenting an outline conforming to the interior of tube, the edges being bound in an elastic medium so as to form pistons when in the tube. The machinery by which the movement of the cars is effected is placed in the rear of the Holborn Station (at the division of sections), and consists of an engine having a pair of 24-inch cylinders with 20-inch stroke, working continually a fan 22 feet in diameter geared at 2 to 1 with the engine, the alternate action of pressure and exhaustion being governed by valves. Its working speed is 160 revolutions per minute, which gives a pressure of about 6 ounces per square inch.

Trains are drawn from Euston and the Post-Office by exhaustion, and propelled by pressure to those points. The entire round trip, being about 6 miles, is made in from 15 to 20 minutes, carrying a load of ten tons.

There are several Viaduct Railways in London, but none are used exclusively for city travel, so I shall pass them by and proceed to the consideration of the plans proposed and in operation in New York City, which are of every conceivable variety, but may be classified as follows, to-wit:

*The figures are on a plate opposite page 331.

1st. Underground roads, such as proposed tunnel road, Arcade plan and underground pneumatic tubes.

2d. Elevated roads constructed over the center or sides of existing streets.

3d. Elevated or depressed roads, requiring new avenues to be opened through business or resident blocks for their exclusive use.

The supposed success of the London underground railway originated the idea that a similar plan would afford the necessary relief for New York, and, as a result, attracted the attention and assistance of many influential and wealthy gentlemen; but their labors have been rewarded but very poorly, as the people have become convinced that the construction of such a road is almost impracticable, on account of its immense cost, arising to some extent from the nature of the materials in which it would have to be built, the lower portion of the city being loose sand and the remainder solid gneiss rock. Be this as it may, some of the plans proposed for underground travel possess considerable merit, among which may be found:

1st. The Arcade Railway. This plan contemplates the use of the entire width of streets under which it may pass, exclusive of five feet of area allotted to buildings on either side. The excavation being made to the line of areas, the sidewalks and roadway will be replaced on groined arches of solid masonry springing from five rows of heavy hollow iron columns, which rest upon secure foundations of masonry ashown in fig. 5. The masonry of the arches will be rendered water-tight by a coating of asphaltum, upon which will be formed a road-bed of dry sand, rammed and rounded to receive pavement. The surface water will be conducted from above to the sewer through some of the columns.

In the new avenue thus opened will be placed a four-track railway for freight and passengers. The whole length will be lighted and ventilated from the open space adjoining the buildings. The columns under the roadway will be 22 feet apart, and those under the sidewalks 11 feet apart. By this plan the property will be enhanced in value, as the basements or present cellars will be fitted up as stores, etc., and suitable sidewalks will be made below immediately under the others, reached by winding staircases placed at proper distances. Thus will be secured a comfortable promenade at all seasons of the year. The cost of the structure is estimated at \$2,096,550 per mile.

2d. The Manhattan Railway Company proposes to construct a double-track railway chiefly under Broadway, similar in every respect to the London Underground Railway, except that the ventilation will be provided through 12-inch iron pipes communicating with open columns standing on the curb-stone, to be used as lamp-posts. Estimated cost, \$2,000,000 per mile.

3d. The Beach Pneumatic Tube, three hundred and twelve feet of which is at present in operation near the new Post Office. It is 21 feet below the surface, and consists of a circular tube or tunnel 8 feet in diameter, composed of iron or masonry, as the case may require. The car is circular in form, and rides very comfortably. It runs upon a track of about four feet gauge, with a central rail, by which the speed is checked with a powerful brake. The car is moved by pneumatic pressure and exhaustion supplied by an immense blowing machine capable of discharging 100,000 cubic feet of air per minute through an opening 5 feet square, with a velocity of 60 miles per hour. The cost of this road is estimated at \$1,000,000 per mile.

There are besides those mentioned some eight other methods proposed for underground roads, but they are all more or less similar to those already described. Now as to the second class:

As early as 1847 a plan for an elevated railroad was presented for consideration, approximating very closely to the one now erected and known as the Greenwich Street Railway, a description of which will serve for both.

1st. The Greenwich Street Elevated Railway extends from the Battery up Greenwich street and Ninth avenue to Thirtieth street. The track is supported by columns nine inches in diameter, of wrought iron, placed 25 feet apart along the curb-stone, resting in foundation piers of masonry, the tops of which are provided with a patent adjustable socket. The tops of these columns extend in a Y to the girders, upon which the track rests, about 15 feet above the sidewalk. The motive power has been, until lately, an endless rope worked by stationary engines built under the sidewalk every half mile; but now they have substituted a steam dummy, and I understand they are building turnouts, so that they can operate more trains. The cost has been about \$275,000 per mile.

2d. The Elevated Gothic Arch Railway is undoubtedly the most feasible, elegant and economical plan of all proposed. The design is to erect at intervals of about 75 feet wrought-iron Gothic arches, the base of each arch or rib to be on the sidewalk near the curb-stone, and the apex over the center of the street. At such a height above the street as not to interfere with its use for ordinary purposes, a second arch of iron will be thrown, of elliptical form, immediately under and connected with the outside or Gothic arch. The whole will be sufficiently braced together will form an independent pier resting on solid foundations of masonry beneath the surface of the street. From the middle of the inner to the apex of the outer arch, a longitudinal iron truss supports the tracks, aided by smaller trusses on either side.

Between these trusses, and passing across the lower chord of the middle one, are laid the floor beams, also of iron, on which rest the tracks. These are to be connected by diagonal tension rods and struts, so that they act as a horizontal truss and prevent lateral swaying of the structure. The whole to be left open to avoid the accumulation of snow and obstruction of light and ventilation. It will be seen then that the cars move upon a trestle bridge above the tower and under the outer arch, as per fig. 6. It is proposed to use light covered locomotives emitting neither smoke

nor steam. Access to the cars will be given by platforms constructed of iron and glass, leading from comfortable waiting-rooms at suitable intervals on either side of street, from which commodious stair-cases will lead to the street below. A careful consideration of this design reveals the fact that it is the only one calculated to afford the required relief to over-crowded streets in any city, as it meets the demands of the people in every particular, combining as it does architectural beauty, capacity, durability and economy. The cost is estimated at about \$600,000 per mile, including stations, etc.

3d. The Gilbert Elevated Pneumatic Railway. This design contemplated placing a double line of atmospheric tubes on compound Gothic arches, similar in every respect to those described in the last design. Through these tubes passenger cars were to be propelled by atmospheric pressure. This design was found to be impracticable, and was modified by leaving off the upper portion of the tubes, thus converting it into a railway running in the trough thus formed, and steam was to be used as the motive power.

This, however, did not give satisfaction, in consequence of which the whole design has been remodeled, and is now presented as in fig. 7, which is an unsatisfactory imitation of the Elevated Gothic Arch.

4th. Mr. Alfred Speer, of New Jersey, has patented a very novel plan, which is to consist of an endless movable sidewalk running at about 10 miles per hour up one side of the street and down the other. This will be supported above the present sidewalks by iron columns placed at the curbstone. On the sidewalk thus supported will be arranged comfortable chairs for the convenience of passengers, who will be taken on or off with transfer chairs, as the sidewalk will not stop.

There are some twenty or more other suggestions for elevated railways of this class, but time will not admit of their being named.

Now as to the third class, or railways requiring avenues set apart exclusively for their use, these are

1st. The Viaduct Railway is to consist of two lines, both starting from near the City Hall Park at the New York end of the East River Bridge, running together as far north as Bleeker street, there dividing, one running to One Hundred and Thirtieth street and the other to Westchester. The railroad will have four tracks built on arches of brick, supported by heavy iron lateral columns, themselves supported by inverted arches of solid masonry built into the ground. A thick bedding of earth on which the tracks will rest will deaden the sound of passing trains. The road will be carried on bridges over the streets and pass through the blocks, either traversing the back yards of houses or stores, or when near the street forming the roof to a series of arcade stalls filled up as stores, markets, bazaars or for manufacturing purposes. Steam locomotives will be used, drawing suitable trains at 20 miles per hour. The estimated cost is \$3,000,000 per mile, including right of way.

2d. The New York Depressed Railway. The location of this road is through the blocks parallel with Broadway from the Battery to Harlem River. It consists of a roadway 25 feet wide sunk in an open cutting, walled up on either side, and passing under bridges at each cross street, and, where passing under buildings, a fire-proof floor is provided for the building, avoiding its destruction. The motive power is to be steam or pneumatic traction engines, running on a double track. The approximate cost is \$250,000 per mile exclusive of right of way.

3d. The Metropolitan Transit Company. This Company proposes to construct a three-tier railway, viz., through the basements or cellars of houses a double-track freight road operated by steam; at the height of the sidewalks a double-track horse railway, and in the second story a steam passenger road also with double track, crossing the streets under and over suitable bridges. The cost of construction is estimated at \$750,000 per mile, exclusive of right of way.

4th. The Grand Elevated Railway from Chambers street to King's Bridge, to be made by opening an avenue 150 feet wide, in the center of which would be built a four-tracked roadway, elevated about 20 feet above the surface on arches constructed of brick, with wrought-iron tubular bridges at street crossings. Trains to run at a high speed, stopping every mile, and drawn by steam locomotive engines.

There are about twelve designs of this class other than those mentioned, but time will not permit me to describe them, however briefly. It will be plainly seen that the cost of right of way will effectually prevent the construction of any in this class, at all events for some time to come. They however possess some merit, as they do not interfere with present streets except where they cross; and yet it should be borne in mind that the existing streets are capable of affording the necessary ground, therefore all new avenues would sacrifice just so much valuable real estate unnecessarily, which is a great fact in favor of those over the center and sides of streets; and there is no doubt in my mind but some one of those proposed will eventually be adopted in most of our largest cities in preference to either the underground or through-block systems.

An Irrepressible Shareholder.

The English papers report the following passage at arms between Sir Edward Watkin, the Chairman of the Metropolitan Railway Company, and a shareholder, at a recent meeting of shareholders in London. Mr. Hale had made a motion to restrain from passing the report and accounts, reflecting upon the board, and finally began to read a part of a judge's decision:

The CHAIRMAN again interposed, reminding the speaker that this had nothing whatever to do with the report and accounts, and said he thought Mr. Hale ought now to bring his observations to a close—a remark that was received with loud applause.

Mr. HALE said he supposed that the Chairman had to attend the South Eastern board to answer inquiries, and that from there he would rush off to the Metropolitan Board of Works; but, of course, he could not give the poor shareholders of the

Metropolitan any part of his time for the £40 per week he was receiving from them. His time was very precious, no doubt.

The CHAIRMAN—Mr. Hale knows perfectly well that what he has just stated has not a shadow of foundation. I am at your service till I have to go to the Board of Works at one o'clock; and if it is your wish to stay here all day when I am gone, I am sure one of my colleagues will take my place in this chair. But I will now ask the meeting whether they wish that this thing shall continue? [Loud cries of "No, no."] Those in favor of Mr. Hale's discrediting his discursive and irregular speech will hold up their hands. [All hands were held up.] Now, Mr. Hale, you see the feeling of the meeting. I will give you two minutes more to conclude.

Mr. HALE—But you must be in your position to hear what I have to say so long as I speak fairly and to the point. The Vice-Chancellor said—

The CHAIRMAN—Really we cannot hear that. I now rule that Mr. Hale must sit down. Does anybody second Mr. Hale's amendment?

A SHAREHOLDER—I will second it.

Mr. HALE still persisted in speaking, and for several seconds great confusion prevailed.

The CHAIRMAN—Gentlemen I cannot have this any more, and I do not intend to have it. I now ask those who are in favor of Mr. Hale's motion to hold up their hands. [The hands of the mover and seconder only were held up.]

The CHAIRMAN then put the resolution for the declaration of the dividends, and it was carried *non, non.*

The CHAIRMAN—I shall now be glad to hear you, Mr. Grant.

Mr. GRANT—But I am possession of the chair, and I do not mean to sit down till I have finished. [Uproar.]

The CHAIRMAN—I have now only another course open to me, and that is, if Mr. Hale does not immediately sit down I will have him removed from the meeting. [This was received with prolonged cheering.]

Mr. HALE—I am in possession of the Chair. The Vice-Chancellor said—

A SHAREHOLDER—Is it necessary to have all this disturbance to teach a fool that he is a fool?

The CHAIRMAN then put it to the meeting whether it was their wish that Mr. Hale should be turned out, and the response being in the affirmative, he sent for the hall-keeper, who arrived amidst loud cheering and laughter, and the situation began to look uncomfortable for the obstinate individual who persisted in obstructing the course of business by his pointless, offensive and stupid observations. The hall-keeper desired Mr. Hale to retire in his custody, but the recalcitrant shareholder defied the right of Sir Edward to have him removed, and stood apparently unmoved at all the hisses and marks of contempt with which he was greeted on all sides.

The CHAIRMAN [addressing him]—You must go, sir. [To the hall-keeper]—Don't do any violence.

Mr. HALE—That is what I have been waiting for, and then I should have a remedy.

The CHAIRMAN—Really, gentlemen, did you ever know a body of men so insulted in your life. [Cries of "Never," "Turn him out," &c.]

Several shareholders appealed to Mr. Hale to sit down, but without avail.

Mr. HALE—I am attending to my own business. The Vice-Chancellor said—

The CHAIRMAN—Now, gentlemen, there is only another course open to us. We have done all the business; therefore let us separate. I announce that the meeting is at an end, and I am only sorry that I have not had an opportunity of listening to many of you whom I wished to hear.

Mr. HALE—I shall live long enough to make you unavailingly regret the way you have treated me.

The CHAIRMAN—I never knew any man so degrade himself,

and so insult a meeting in my life. I hope that what has taken place will be a lesson, because, depend upon it, if it occurs again I shall take a different course. Gentlemen, we bid you good morning.

Disposition of the St. Paul & Pacific Case.

The following are the main points of the decision of Judge Dillon in the application of bondholders for a receiver to take charge of the construction of the St. Vincent and Brainerd extensions:

"The application of the plaintiffs for the appointment of a receiver in this cause coming on for hearing before me, at my chambers, in the city of Davenport, in the State of Iowa, and after having the bill and various affidavits and proofs of the respective parties, and Messrs. Gilman, Otis and Guifilan, of counsel for the plaintiffs, and Mr. Bigelow, of counsel for the defendants, the First Division of the St. Paul & Pacific Railroad Company, and George L. Becker and Horace Thompson and Mr. Gray, of counsel for the defendant, the St. Paul & Pacific Railroad Company, and Mr. Smith, of counsel for the defendant, the Northern Pacific Railroad Company, appearing specially and objecting that the Court had not jurisdiction of said defendant, and Wm. Cuylar, of counsel for the defendant, Wm. G. Morehead, and after due deliberation thereon it is ordered, adjudged and decreed that John P. Farley, of Dubuque, Iowa, be and he is hereby appointed receiver of all and singular that certain branch line of railroad of the defendant, the St. Paul & Pacific Railroad Company, or which the said railroad company is by law authorized to construct, and which is to be constructed and to run from a point at or near the town of St. Cloud, in the County of Stearns and State of Minnesota, to the town of St. Vincent, in said State; and also of that other line of railroad of said defendant, the St. Paul & Pacific Railroad Company, which said railroad company is by law authorized to construct, and which is to be constructed and to run from Watab, in the County of Benton, to Brainerd, in the County of Crow Wing, within said State, as contemplated by various acts of Congress of the United States; and also of all the right, title and interest which said defendant, the St. Paul & Pacific Railroad Company, has now or shall at any time hereafter acquire by reason of the construction of said railroads, or of either or of any part of either thereof, in, to, or concerning all the lands situated in said State of Minnesota, and granted or intended to be granted by various acts of the Congress of the United States for the purpose of aiding in the construction of said lines of railroad, &c., &c. And the said receiver is hereby authorized and directed forthwith to take possession of all and singular the aforesaid property, and to proceed without delay to construct and complete the unconstructed portions of said railroads, and to put those portions thereof already constructed or partly constructed in good order, to be operated as railroads, and to do the same, if practicable, by or before the 3d day of December next. And he is further authorized and directed to do and perform all acts and things necessary to be done and performed, to vest and secure in said railroad company the title to all lands granted or intended to be granted by any acts of Congress or of the Legislature of the State of Minnesota to the said railroad company.

"And for such purpose the said receiver is hereby authorized and directed to borrow on the terms, as to time of payment and rates of interest, set forth in the following form of debenture, a sum of money not exceeding \$5,000,000, &c., &c.

"Until the further order of the Court said debentures shall not be sold for less than par in the currency of the United States, and before any shall be sold the receiver must be satisfied that he can sell or place sufficient thereof to complete and equip the said road.

"And the defendants, and each of them, having in their, his,

or its possession or under their, his, or its control any of the property hereinbefore mentioned are hereby ordered forthwith, upon the demand of said receiver, to deliver the same into the possession of said receiver; and the said defendants, and each of them and their, his, or its officers, agents, attorneys and servants are hereby strictly enjoined and commanded absolutely to refrain from interfering with the said lands, premises and property, or any part thereof, and from in any manner interfering with the said receiver in the performance by him of the acts which he is hereby directed to perform. This injunction shall not be construed to prohibit the officers of the St. Paul & Pacific Railroad Company from taking any steps necessary to secure to said company title to lands granted to it, nor to prevent the Northern Pacific Railroad Company asserting before the departments at Washington, or in any court, its right to any lands granted to it.

"The main object of this order is to insure the completion of the said roads by the 3d day of December next, and the receiver is instructed so to act, under the limitations aforesaid as to see that this object shall be accomplished, and to proceed at once and with expedition."

This decision of the Court was submitted to the Amsterdam committee of bondholders, and it is reported that they readily determined to advance the money needed to complete the extensions in time to secure the land grant.

Judge Dillon appointed as receiver Mr. J. P. Farley, of Dubuque, President and Superintendent of the Dubuque Southwestern Railroad ever since its construction, we believe, and esteemed an honorable and careful man.

Contributions.

Suggestions to Contractors.

To THE EDITOR OF THE RAILROAD GAZETTE:

Contractors for "doing" the earthwork of railroads are often so badly deceived in the quality of the substrata of earth in particular localities that great trouble and pecuniary loss result from mere want of knowledge which might have been easily obtained. For instance, an individual agrees to make a certain section of a proposed railroad line ready for ties at, say, twenty-five cents per cubic yard. He goes over the route and examined the surface, but, not having been a close observer, he sees nothing to indicate any unusual feature of the under-earth. He feels sure of a paying job, and forthwith enters into an iron-clad bond to fulfill the contract at the stipulated price. For a while all goes well. The ground plows easily, the scrapers work admirably, and he feels elated. But at length his laborers strike a stratum of hard-pan, or tough clay, or quick-sand, and the ruin to all his visions of money-making, as regards that job, stares him in the face. Nothing remains to him but to either work ahead and lose money, or try to beg terms of his employers—either of which is a bitter pill. Now a little close observation, a little intelligent study of what daily comes before the eyes of any one doing the business of railroad earthwork contractor, will prevent any misfortune of this kind.

A few hints and suggestions on this subject may be of interest and benefit to quite a large number of the readers of the RAILROAD GAZETTE.

First, then, hard-pan, the bane of contractors, especially on our Western roads, is generally found at a considerable distance below the ground surface, and unless some natural or artificial section discloses the substrata of the proposed work, the presence of hard-pan must be discovered either by boring or by a careful and intelligent examination of the surface. If it will not pay to bore, and thus settle the nature and thickness of the substrata beyond any doubt, the consistency of the under-clay may be very closely anticipated from the kind of soil and the sort of timber found in the vicinity.

White oak most frequently grows on thin soil overlying a stiff, bad clay, sometimes grayish blue, sometimes red, and below this refractory hard-pan is often found, especially in the bluffs bordering streams.

Black walnut is generally found growing in a deep black or brown loam, underlying which you may expect sandy clay or gravel, though in a stony section you may hit upon a ledge of rock or a bed of unwieldy boulders. A careful examination, however, will generally disclose the existence of rock, if there be any.

Shell-bark hickory in the Western States is generally found growing on a stiff, sour soil, above a stratum of earth difficult to handle with scrapers, and often tough to the pick or plow.

White walnut is frequently found above stone or gravel; so of huckleberry and sugar-maple; but the general features of the country, local upheavals and a variety of particular disturbances, may often modify or totally change the rule, i. e., "like timber, like soil." A habit of observation will, however, enable one to detect the variations.

The soil, too, is, as a general rule, a pretty safe index of what lies below it, provided always that you are somewhat acquainted with the general features of the country, or rather of the locality in which your contract lies. It is rarely the case that a deep, loose soil overlies refractory clay, or, if it does, you may expect the latter at a great depth. On the other hand, a stiff, thin soil almost invariably indicates underlying clay nearly impervious to water.

In a hilly or rolling country, where there is no appearance of stone or gravel, stunted trees and a thin gray soil indicate a bad under-clay.

Sandy soil intermixed with pebbles rarely overlies any very refractory clay: more frequently a substratum of gravel will be found, and, if the ground surface is flat, you may strike quick-sand, especially if black, sandy bogs are to be found in the vicinity.

Stream banks and ravines, the faces of bluffs and hills will often disclose to the most unpracticed eye the nature and consistency of the substrata by outcroppings of stone, clay, hard-pan or gravel. Where nothing of this kind offers, the wells of the neighborhood may be examined to great profit.

In fact, the professional earthwork contractor ought to be

somewhat of a practical geologist, though, for that matter, he may be utterly ignorant of geologic nomenclature. In his business, as in every other, it is highly necessary to keep the eyes open and alert. Observation and attention will avoid a host of misfortunes and consequently result in what he desires—money. No matter what experience the contractor may have had, no matter how capable of managing men and tools to advantage he may be, he is ever open to misfortune, nay, to disaster and bankruptcy, unless he have a mind stored with knowledge of the sort suggested above, and I have not a doubt that many contractors who read the RAILROAD GAZETTE feel their pockets lighter to-day on account of such prerequisite to success having been absent when certain contracts for earth-work were duly signed and sealed. Knowledge is power, and no knowledge is such a power as that gained by watchfulness and intelligent study in the proper field of one's business.

HOOSIER.

Boston Freight Rates Westward.

BOSTON, August 11, 1873.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of 9th inst., under the head of "Discriminating rates" complained of by New York shippers, you state that rates from Boston to Chicago are nearly always five cents higher on fourth class than New York, and on first class ten cents higher.

The facts are that freights from Boston to all Western points are the same as from New York. That is, they are so advertised. It occasionally happens that goods can be shipped from Boston to the West at lower rates than from New York, and it sometimes happens the other way; but the current and advertised rates are the same from both cities. It is, perhaps, a matter of no particular consequence, but when you are wrong I presume you are willing to be set right; hence this communication from

BOSTON.

[We are much obliged to "Boston" for his correction. Our mistake arose from confounding eastward with westward rates. The former we have most frequent occasion to study, and our remembrance of their differences we had applied to westward rates.—EDITOR OF THE RAILROAD GAZETTE.]

Built Stringers for Bridges—A Correction.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In the bill for bridge timbers, on page 319 of your issue for August 9, "4 sway braces $21 \times 4 \times 10 = 280$ feet" should be added to the bill, which will bring the total number of feet

B. M. given, correct.

August 12, 1873.

Principles of Railroad Taxation.

During the discussion of the railroad article of the proposed new constitution in the Pennsylvania Constitutional Convention last April, an interesting debate was had on the section concerning the taxation of corporation property, which was as follows:

"All property, real and personal, of railroad, canal and other joint stock corporations shall be subject to taxation for all purposes."

On this subject, Mr. Franklin B. Gowen, President of the Philadelphia & Reading Railroad, said:

MR. CHAIRMAN: I dislike to trouble the committee so frequently on a matter of this kind, especially as my interests outside of the convention are supposed to be so connected with corporations as to make it improper for me to speak here as other gentlemen have. I feel like saying, and I think I can do it, however, without egotism, that I have been somewhat astonished at the effect my very appearance has created upon many of the members of this committee. I want to say that I do not think I am quite as dumb as I look [laughter], and I really believe that I do know some little about such subjects as those now under consideration.

This section brings up for consideration a very important subject; it is this: That counties, and townships, and boroughs, and school districts, and each and every petty municipality throughout the State, are to have the right to tax a public highway as a public highway, to tax the road bed and the appurtenances of the road bed for the purpose of raising revenue. The right of taxation necessarily must be followed by the right to enforce the payment of the tax; and you vest in the petty municipalities of this State the right to lay their hands upon a highway over which the people of any part of the State have a right to travel, and sell it to the injury of the public, the detriment of the bondholders, and the mortgage creditors who lent their money upon the faith of the Commonwealth of Pennsylvania. It is repudiation in its worst and most ignoble aspect to permit a collector of a two-penny tax for a school purpose to return against an incorporation an unpaid tax of ten cents upon the highway over which the commerce of the State is to pass, and sell it away from the corporation to the destruction of those who lent their money upon its securities on the faith of the Commonwealth of Pennsylvania.

Now, I take it, Mr. Chairman, that there are certain broad general views which should govern every question of this kind. I take it that a Constitution for the State of Pennsylvania is not to be framed exactly as a Constitution for a State like Illinois, or a State like California, or a State like Mississippi or Louisiana; but in framing a Constitution for the State of Pennsylvania we have to pay some regard to the character of the State and to the character of the business that is to be transacted in that State which is to render it prosperous.

Now, Mr. Chairman, there are certain periods in the history of every nation; there are certain epochs and cycles which present themselves alternately and periodically, and which, when once presented to a people and they refuse to take advantage of them, are lost forever. What student of history can fail to note how commerce has spread its wings upon one shore for a century or two centuries and then desert them forever?

Who does not recall that, during the Middle Ages, when Venice and Augsburg and Nuremberg, and the inland cities of the continent of Europe were the highways through which the commerce of the East passed to the West; and who does not recall the decayed magnificence of those States—the very moment the navigation of the seas was properly understood, and commerce went by the ocean? And who can fail to see now

that the tunneling of a great chain of mountains, like the Alps in Europe, is again to change the course of commerce, and to build up the communities that have been down in the dust for five hundred years?

The axiom that I desire to enunciate here for I take it as an axiom which cannot be contradicted, is this: That the empire of the world is to be vested in that State and that community that has the greatest wealth in minerals and fuel. It is the wealth of minerals, and especially the wealth of fuel, that gave to England the supremacy which she has had for five hundred years; and in this very year, and at this very time, the people who are conversant with this subject see that that sceptre is as surely passing from her grasp as the sceptre passed from the grasp of the Persians when Alexander conquered their country. Where is it to go? The people of England admit themselves that it is to come to the shores of America. Where in America

will prevent, and largely prevent, capital coming into this State, and most surely drive it into the borders of other States.

In another part of the debate Mr. Gowen said:

Mr. Chairman: I think it is proper that I should state here the objection which I intended to urge to this section yesterday, and which, it seems, was not understood. I did not claim that because property was owned by a corporation it should therefore be exempted from taxation. In other words, I did not claim that the exemption should result from the ownership, but that the exemption should follow the purpose for which the property was used.

Now, if this amendment were added to the section as originally reported, it would cure all the objection I find to it in its present shape, namely: Insert after the word "personal" these words, "other than such as constitutes part of any public highway, and such as is necessarily incident to and used for transportation upon any such public highway."

It seems to me that a system of laws which has grown up in the course of two generations, and which is based upon the decisions of the Supreme Court is entitled to great respect. If law is the perfection of human reason, the people of Pennsylvania have no right to say that the Supreme Court of this State have not been its proper exponents. What are the reasons given by the Supreme Court of Pennsylvania against taxing the roadway of a railway company or its rolling stock? They are these: That the road is a public highway; that every citizen of the State is entitled to travel over it, and that the owners of that roadway have no right to permit that use to be taken away by their neglect in paying the taxes upon it. That is the reason and the only reason.

Again, a man exercises a right for twenty-one years, and his title by prescription becomes conclusive, and as good as any which is created by a grant. But the Supreme Court has said that a man who for twenty-one years, without any antecedent right, but without molestation or opposition, exercises a right of way over a public highway, if any part of the estate of a company, which is a public highway, acquires no right at all. Why? Because this public highway, owned by the particular company, is to be used by all persons, and the neglect of the managers of that company to stop this trespass is not to be used to take away from other people the right which the Legislature intended they should have upon the public highway.

Now, if the amendment that I suggest should be adopted, it would cure all the objections I have to this. Of course, to the amendment by the gentleman from Philadelphia (Mr. J. Price Wetherell), there can be no objection on the part of any corporation, but there might be a very grave objection to it on the part of people outside of the corporation. If corporations are not to be taxed in any other manner whatever, than as individuals are, the State will lose a very large amount of revenue. When gentlemen get up here and say that these great corporations must pay their share of the taxes, that it is wrong for them not to do it, it is well for us to know that the corporations of the State of Pennsylvania pay not less than sixty per cent. of the entire revenue of the Commonwealth. The entire receipts of the Commonwealth of Pennsylvania during the last year, were \$7,100,000, of which \$600,000 or \$700,000 was not income, but was partly principal repaid, some of it being the proceeds of the public land which the general government gave to the State for agricultural college purposes. This would reduce the actual income of the State to about \$6,500,000, and the corporations of the State of Pennsylvania alone paid nearly \$4,300,000.

Certainly they will pay their share; they are paying more than their share. I believe I would advocate an amendment, whether offered by the gentleman from Philadelphia or by any one else, by which the corporations would be taxed as individuals are. But I cannot see the propriety of encouraging one man to invest his money in the State, giving him all the encouragement you can, and the moment he associates two others with him and forms a corporation, of hurling upon him the condemnation of this State. Where is the difference? I know that some corporations have abused their trust. I know that acts have been or may have been committed which may arouse a feeling of indignation against corporations; but do not mix up the mere fact of the ownership of property on the one hand with the abuse of corporate power on the other. As far as any gentleman in this Convention will go to correct that abuse, I will follow and go one step further. If the swift lightning of God will not blast the public wretch who violates his trust or wither the hand of the corporative officer who presents a bribe, let this Convention do whatever in its power it can do to make the crime a hissing and a scorn. Turn the guilty wretch out of the pale of society, brand him with the mark of Cain, send him out through the darkness of oblivion and into the night of infamy. But whatever you say shall be done, I will go one step farther in this Convention and say something more shall be done; but do not let us say here that the mere ownership of property is a crime the moment the ownership is vested in more than one person.

Fast Traveling.

A recent number of the Erie (Pa.) Observer says:

"On Monday a special train over the Philadelphia & Erie Railroad, consisting of one of the elegant new coaches turned out at the Renovo shops, drawn by engine 1085, made the trip between here and Kane, 94 miles, in 2 hours and 14 minutes, inclusive of stoppages at Union, Corry, Youngsville and Warren. The 30 miles of this distance between Warren and Kane were run in 35 minutes, making an average of a mile in 1 minute and 10 seconds, or over 51 miles an hour. Considering the frequent and abrupt curves on that portion of the road, and the fact that the grades are ascending all the way from Warren, an altitude being reached at Kane of over 2,000 feet above the level of the sea, this is one of the most extraordinary runs on record. The engine that drew the train has recently been refitted at the Erie shops, and was in charge of Engineer Patrick Tully and Fireman William C. Danaher. Returning, the train ran from Kane to Corry, a distance of sixty miles, in one hour and forty-five minutes, including a stoppage of fifteen minutes on a siding west of Warren. The best time on the whole trip was made between Waterford and Jackson's Station, the speed attained on that part of the route being a mile in a minute and four seconds. This, it must be remembered, was not for a single mile, but was continued over a section five or six miles in length, with a very considerable gradient.

"The party on board the train consisted of William A. Baldwin, General Manager of the road, and his clerk; J. W. Reynolds, Superintendent of the Western Division; J. Q. Disbrow, Train Dispatcher; J. Ross Thompson, Solicitor, and the writer of this article. The object of the railroad men was partially to test the condition of the track, and in part to effect some business negotiations at Kane. Of the former, the facts above stated are the best evidence that could be given."

Prices of Rails in July.

Foreign iron rails sold for \$64 to \$65 gold and American for \$74 to \$78 currency. Steel rails were \$108 to \$112 gold for foreign and \$120 to \$125 currency for American. The imports of iron rails at New York were only 2,632 tons in July, and 41,449 tons for the seven months; of steel, 5,526 tons in July and 48,343 for the seven months. Of steel and iron the total imports were for the seven months 99,793 tons in 1873, against 100,319 tons in 1872 and 96,971 in 1871.



Published Every Saturday.

CONDUCTED BY

S. WRIGHT DUNNING AND M. N. FORNEY.

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Editorial Announcements.

Removals.—The Chicago office of the RAILROAD GAZETTE has been removed to No. 77 Jackson street, opposite Third avenue. The New York office of the RAILROAD GAZETTE is removed to Room 131, No. 73 Broadway, opposite the upper elevator landing.

Correspondence.—We cordially invite the co-operation of the railroad public in affording us the material for a thorough and worthy railroad paper. Railroad news, annual reports, notices of appointments, resignations, etc., and information concerning improvements will be gratefully received. We make it our business to inform the public concerning the progress of new lines, and are always glad to receive news of them.

Inventions.—No charge is made for publishing descriptions of what we consider important and interesting improvements in railroad machinery, rolling stock, etc.; but when engravings are necessary the inventor must supply them.

Articles.—We desire articles relating to railroads, and, if acceptable, will pay liberally for them. Articles concerning railroad management, engineering, rolling stock and machinery, by men practically acquainted with these subjects, are especially desired.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN OPINION, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

THE PROFITS OF RAILROADS.

The farmers' meetings and conventions, which continue to be frequent in the Northwest, and apparently are well attended and earnest, seem to us to have changed their tone slightly of late months, becoming less instead of more definite in their charges against railroads, and perhaps not quite so bitter; and, what is possibly quite significant, making the railroads only one of several parties and things against which their condemnation is expressed. Sometimes it is the increase of official salaries, sometimes manufacturers and merchants in general, sometimes the tariff, and not infrequently all these which are designated as the enemies of honest farmers. Many of the expressions, and some by prominent men among those who appear earnest in their complaints, are simply ridiculous, except from the socialists' point of view. That some men grow rich with little labor or desert and that many struggle hard for little more than a bare subsistence is now true as it always has been; but scarcely any party except the Paris Commune and its types in various European countries where vast numbers of men have actually no property, propose seriously to adjust the distribution of wealth by law, which is what some men in Illinois and Iowa, nearly all land-owners and the spokesmen of land-owners, have virtually proposed to do. We shall be mistaken, however, if we accept this communistic feeling—the spirit of the European Red Republican—as an explanation of the Western farmers' movement. The cries are varied, often unreasoning, sometimes fierce and threatening, generally not very intelligible. But they indicate one thing very plainly—that these men are hurt, or believe that they are. They find that their farms and the results of their labor and expenditures on them are less productive now than they have been for many years, and that if this state of things continues their farms will be worth less in the market, and that therefore there will be a large decrease in their wealth. They are justly anxious to mend their present condition and to prevent the depreciation of their property, which in the aggregate is of enormous value and on the whole has almost constantly increased in price,

if not in value, and they do well to study all the circumstances which effect the price of their produce and the cost of their supplies; and, the charge for transportation forming a very large part of the price paid for some of their coarser products, especially grain and more especially coarse grain, by the consumers on the Atlantic seaboard and in Europe, it is natural and proper that they should examine into the prices of transportation and learn if possible what relation the price bears to the cost, and also ascertain whether means cannot be found to reduce the prices if unreasonable, and the cost if the price now is reasonable. There is no question as to the importance of the matter. The farmers feel its importance now, because the prices of their produce happen to be low, and they suffer in consequence; but a reduction in the price of transportation would probably benefit them still more when prices are high, when the consumption is in excess of production, and when, consequently, buyers compete for the privilege of buying, instead of sellers competing for the privilege of selling, as is largely the case now. That is, while a great reduction in the price of transportation would increase the price received by the Western farmer for his grain when prices to the consumer are lowest, it would increase them in a still larger proportion when prices to the consumer are high. There are large districts now partly settled which can never expect to export corn to the sea-board at current rates of transportation. There is nothing essentially strange or hard in this, any more than there is in the inability of Iowa to export hay to England. There is an enormous market for hay in England at what Iowans would call high prices, and Iowa is able to produce a million of tons of surplus hay; but no one thinks of shipping Iowa hay to Liverpool, and the river counties are pretty well satisfied if they can ship a little down the Mississippi by the cheapest carriage to the South, where there is also a market for hay at good prices. We all understand that hay even at a high price is too cheap to be able to bear much transportation. Corn bears a higher price, and can be carried further; but it also has its limit. It must be worth in Liverpool now about 85 cents a bushel, which is very little more than \$30 a ton. This sum will not carry any freight an indefinite distance, if the transportation is done at cost, so that there are limits to the distance at which corn may be shipped for export, and any sudden and large increase in the production of corn, or of other grains and substances for which it is a substitute, are very likely to reduce this distance very suddenly. Let us say, for instance, that on the cheapest land corn cannot be grown profitably for less than ten dollars a ton, and that the cost of transportation to the chief market is \$25 per ton. Then, if by any over-production, or the opening of supplies nearer by, or the introduction of some cheaper cereal, the buyers will not take corn at more than \$30 per ton, we find the price of corn to the producer reduced to one-half of the cost of its production, to his great loss, and without the fault of any one, except those who could not or would not see the signs of the times, indicating that the consuming world would need less corn, or that the producing world was preparing to raise too much.

However, it is unnecessary to discuss the laws of production and prices. We purpose to consider here the complaint of the farmers, still insisted upon, that the railroad companies as a whole are making exorbitant profits, which the farmers largely have to pay.

Now we cannot take the railroads of any given section and say just what they are worth or cost, just what the earnings and dividends have been for any given period, and just how far the prices were affected by the profits paid to shareholders. But we can say pretty nearly what capital stock and funded debt of such roads were, and their earnings for the last year reported, which year will be different for different roads, but will be a very recent one, so that the results will be very nearly as accurate as if we had the figures exactly for the last calendar year.

We will first take the whole country, whose roads in operation by the last reports giving earnings, etc., amounted to 57,823 miles, with stock and debts amounting on an average to \$55,116 per mile, \$26,373 of which was debt secured by a mortgage on the road. The gross receipts averaged \$8,256 per mile, and the dividends to \$1,124 per mile. Now, as the farmers' conventions are in the habit of saying that the capital stock of railroad company is usually largely fictitious—representing no expenditure made on the property—and as it is usually difficult and often impossible to prove just what a railroad has cost, we will not attempt to fix an amount as the probable actual average cost of our railroads, only saying that the cost as represented by stock and bonds is very much less than the average cost of railroads in any other country in the world, though there is scarcely any other where the cost of labor and materials is so great. We suppose that no one would think that the owners of railroads made extravagant

profits if they received nothing at all, and we will consider what the effect on charges would be if no dividends were paid, and earnings made less by so much. Then we would have the receipts diminished from \$8,256 to \$7,132, which would be caused by an average reduction of 13.6 per cent. in the charges for transportation. Now such a reduction as this is desirable, doubtless, but it is by no means what the Western farmer wants. It would be a reduction in the winter rate on corn from Chicago to New York of a little less than seven cents a bushel, which would be divided between the consumer and the purchaser in varying proportions, according to the proportion of demand to supply. If the farmer should get one half, we do not think he would consider himself much better off.

Or, take it in another way. The total amount paid in dividends by the railroads in the United States for the last year reported was \$64,418,151: a large sum truly, yet only at the rate of \$1.60 for each inhabitant. Now if dividends are cut off on all stock, watered and unwaterted, it would of course be impossible to save more than this \$1.60 per person.

But the people of the Northwest believe that they have special sufferings from the transportation tax, as indeed they must necessarily have so long as their products are heavier and have a greater distance to go to market than the average. These disabilities, however, are natural, with which the railroad companies have nothing to do. But we can consider the receipts and dividends of Western railroads by themselves, and see how far these lines have aggravated these natural disabilities. Fourteen States and territories, beginning with Ohio and Michigan on the east and extending to the Rocky Mountains, including all north of the Ohio, and Missouri, Kansas and Colorado and all north of them, had 28,778 miles of railroad, with a reported cost of \$50,550 per mile, \$25,182 of which was capital stock. The gross amount of dividends paid by this mileage was \$20,496,447, or \$712.65 per mile, being at the average rate of 2.83 per cent., most of the companies paying no dividends. The average receipts per mile of these roads was \$6,735. If then no dividends had been paid, the rates might have been reduced by a little less than 10.6 per cent. The average amount of gross receipts of these railroads to each inhabitant of the States and territories in which they are was \$13.76, and the cutting off of all dividends would have permitted a reduction of \$1.46 cents in this amount. The Western railroads, therefore, pay a smaller proportion of their earnings in dividends, and a smaller amount per inhabitant, than the average in the country.

However great the abuses may have been in individual instances in watering stock, it is plain that the dividends paid on such fictitious stock do not form any heavy burden on the traffic of the country. Nor, indeed, do the dividends on all stock. As we have seen, comparatively a small proportion of the receipts of railroad companies go to pay dividends; by far the largest part is absorbed in the working expenses and the interest on the bonded debts. The "exorbitant profits of stockholders," amounting to an average of 3.91 per cent. for the face of their stock for the whole country, to 13.6 per cent. of the charges for transportation, and to \$1.60 for each inhabitant of the country, are seen to be hardly so grievous a burden as to justify a revolution.

Doubtless the greater part of the unreasonable clamor against railroad companies is owing to the fact that so great ignorance prevails with respect to facts like these, and that not only among farmers and others not accustomed to the examination of such subjects, but among merchants who are leading shippers, journalists and public speakers who desire to understand the subject, and railroad men themselves. Indeed, the statistics are not easily attainable, and until the publication of the last volume of Poor's Manual have not been gathered with sufficient completeness to afford a basis for an application to the entire country. But for certain States and certain routes of great importance the figures have always been attainable, and we have used them from time to time. They show very plainly that the Western farmers and others will not be able to gain the objects they desire by any limitation of the profits of stockholders.

Condition of the St. Joseph & Denver City Company.

The St. Joseph & Denver City Railroad Company has published a report to the bondholders to explain its failure to pay the interest on its bonds, and propose to them a settlement.

The company for a few years has had completed and in operation a line from Elwood, Kan., on the Missouri River opposite St. Joseph, nearly due west 113 miles to Maryville, Kan. This section is mortgaged to secure the payment of bonds to the amount of \$1,500,000, called Eastern Division bonds, which is at the rate of \$13,387 per mile. In 1871 and 1872 an extension was constructed northwestward toward Kearney, Neb., as far as a junction with the Burlington & Missouri River Railroad in Nebraska at Hastings, Neb., 113 miles, and, as we understand, four miles further, the last named four miles not being used. This

Western Division together with the land grant made the security for an issue of \$5,500,000 first-mortgage bonds, which were widely advertised and sold a little more than a year ago. This issue is at the rate of \$17,085 per mile of completed road, which is probably fully twice as great as the cash cost of construction and equipment, of which latter there is very little, the whole line having now but 19 locomotives. The security for the bonds therefore depends very largely on the amount and value of the land-grant. As to the quantity to which the company has claim, there is a conflict of opinion, but the President of the company says that the Interior Department "has expressed its unwillingness, for the present, to issue patents for more than 512,000 acres." Patents for 172,093 acres have already been issued. No land has been sold, we believe. Most of it ought to be valuable ultimately, and the territory just east of the road is now being settled quite rapidly. The line of the road in Nebraska, however, is now very thinly peopled and can furnish very little traffic, while it is not possible to obtain through traffic worth having, owing to a want of connections on the west, the Union Pacific being in position to insist on carrying all through traffic over its own line to Omaha by making rates which will give connections at Kearney no pay for carrying from that point to the Missouri River.

Besides its bonded debt the company reports a floating debt of \$734,425.

To satisfy the bondholders the company propose to issue \$1,100,000 of 7 per cent bonds, payable in ten years and secured virtually by a second mortgage on the land grant. These bonds will be exchanged for coupons of the Western Division bonds for the three years ending August 15, 1874, on the basis of 125 as the price of gold, which would make the coupons for one year's interest on a thousand dollar bond equal to \$100 in the new issue of bonds.

For the satisfaction of the Eastern Division bondholders two loans are proposed: one an income loan of \$300,000, and the other, which is to be devoted also to retiring the floating debt, a second mortgage loan of \$1,500,000. There is also proposed a "revenue loan" of \$2,400,000 for the purpose of completing the unfinished 34 miles of road east of Kearney and equipping the road, secured by what is virtually a third mortgage. This would add to the present debt of the company \$6,300,000—nearly double it. How interest on such an enormous debt can be paid from the means of a railroad 263 miles long through a new and unsettled country is not explained. To pay the interest on the existing debt requires that the road should have a net income of \$2,445 per mile, which is nearly equal to the average net earnings of the railroads in the fertile and populous State of Illinois. The company, however, addressing the bondholders, "earnestly solicit and recommend you to come forward with alacrity and absorb these loans [the two income loans of \$1,100,000 and \$300,000] by the funding of your interest into an interest-bearing security." How much "alacrity" the bondholders have shown in so exchanging we do not know, but we understand that there is a movement among them towards enforcing a foreclosure of the mortgage.

Record of New Railroad Construction.

This number of the RAILROAD GAZETTE has information of the laying of track on new railroads as follows:

Lake Erie, Evansville & Southwestern.—Completed from Evansville east by north 18 miles to Boonsville, Ind. *Cairo & Fulton.*—Extended from Arkadelphia, Ark., southwestward 27 miles to and across the Little Missouri River. *Allegheny Valley—Eastern Extension.*—Completed from the eastern terminus at Driftwood, Pa., westward 20 miles to Barnes' Station. *Providence & Springfield.*—Track laid from Providence northwest to Pascoag, R. I., 22 miles. *Utica & Black River.*—The *Carthage & Clayton* Division has been completed by the extension of track from Lafargeville west 7 miles to Clayton, N. Y. *Montreal, Chambly & Sorel.*—Track is laid from the junction with the Grand Trunk at St. Lambert, Quebec, southeast 12 miles to the River St. John at Chambly.

This is a total of 106 miles of new railroad, 94 of which is in the United States, making a total of 1,966½ miles of railroad completed in the country in 1873.

THE AMERICAN RAILROAD MANUAL, which Mr. Edward Vernon has been compiling, will be ready for issue on about the 1st of September. We have been permitted to examine a proof sheet, which gives an idea of the general appearance and arrangement of the book. The most notable feature at a casual glance is the arrangement of companies by States alphabetically, so that there is no need of consulting an index, which is a considerable advantage to those who have frequent occasion to consult such a work, though it has the disadvantage of separating leased and allied companies from the lessee, which it is usually convenient to study together (but which are not presented together in any work of the kind.) The typography is clear and beautiful, and the pages are large—just half as large as those of the RAILROAD GAZETTE. The sheet we have is a part of the New York list, for which the State Engineer's report furnishes tolerably complete and uniform information. The statements are not very long in any case, though the sheet contains accounts of no more important company than the Rome, Watertown & Ogdensburg. They are pretty uniform in method, beginning usually with a short sketch of the history of the company, of which the following of the Rome, Watertown & Ogdensburg is an example, the fullest one on the subject:

"This company, as at present constituted, is a consolidation of the Watertown & Rome and Potsdam & Watertown Railroad companies. The Watertown & Rome Railroad Company was incorporated by special act of the New York Legislature, in April, 1832, and under that charter, amended at various times, in 1836, 1837, 1845 and 1847, the road was built from Rome to Cape Vincent, a distance of 96½ miles. In 1860 the Legislature

passed an act authorizing the consolidation, by purchase, or interchange of stock, of lines which formed a through route between any given points; and acting under this law the Watertown & Rome Railroad Company entered into an arrangement with the Potsdam & Watertown Railroad Company, who then owned the road from Watertown to Potsdam Junction, for a consolidation of interest by purchase of the stock of the last-named company, and its exchange at an agreed valuation into stock of the new company. The terms of consolidation were satisfactorily arranged, and, in August, 1861, the whole line from Rome to Cape Vincent, and from Watertown to Potsdam Junction, passed into the management of the Rome, Watertown & Ogdensburg Railroad Company, as the new organization styled itself. In 1862 the line from De Kalb Junction to Ogdensburg was built, and the company thus secured independent control of the Canada traffic converging to that point. In May, 1866, the Rome, Watertown & Ogdensburg Railroad Company entered upon a lease of what was then known as the Oswego & Rome Railroad, running from Richland to Oswego, a distance of 29 miles, and agreed to pay as rental 50 per cent. of gross earnings, in addition to guaranteeing the interest on a bonded debt, \$350,000."

A description of the companies' lines is contained in this statement or given after it, and there follows a statement of capital stock, bonded debt and floating debt at the date of the last report, the earnings and their sources, the expenses and their distribution. Usually a statement of "connections" is given and sometimes a separate statement of "characteristics of road", giving length of main line and branches, and second track, and sometimes a statement of equipment. Usually, also, the name of the express line on the road is given. There are no tabular statements, which makes it more difficult to find any particular information needed, but leaves a handsomer page. A list of directors only accompanies this statement, together with the proper address of communications intended for the company.

A directory of railroad officers, classified into executive, transportation and mechanical departments, is to follow the directory of companies. This, if complete and accurate, will be extremely convenient to a large class of people.

This manual is also to have fourteen maps of individual States or groups of States, and, in a pocket at the end of the books a large general railroad map of the United States and Canada.

No criticism of such a work is worth much until after a prolonged examination, as its value chiefly depends upon accuracy in details and fullness. With respect to the latter, there is hardly an opportunity to judge by this sheet, which contains statements of no important company that reports fully. Convenience of reference can justly be claimed for it, however, and this is a very desirable quality.

THE SUEZ CANAL COMPANY reported at a meeting held in Paris, July 15, that the receipts of 1872 were 18,325,024 francs and the expenditures 16,253,745 francs, leaving net earnings of 2,071,279 francs. During the twelve months ending with June last, the maintenance of the channel of the canal at a depth of 27 feet necessitated the dredging of 307,930 cubic metres, against 342,748 cubic metres the previous year. During the first half of 1873, 652 vessels, of an average capacity of 1,655 tons, passed through the canal. The average tonnage of vessels passing through the canal since its opening was 1,338 tons in 1870, 1,489 in 1871, 1,609 in 1872, and 1,655 in 1873. The movement of passengers through the canal was 26,758 in 1870, 48,421 in 1871, and 67,640 in 1872. During the past half year the English steamer European, drawing 24 feet, passed the canal, and a French mail steamer made the passage between the Mediterranean and the Red Sea in 13 hours and 27 minutes. The vessel of greatest tonnage passing through was the transport steamer Malabar, belonging to the English Government, with a capacity of 4,414 tons. The tolls of the canal company are 10 francs per ton of capacity, which for the largest vessel mentioned would make a tax of about \$8,800, and for the average vessel in 1873 \$3,300. The company estimates that this is only 1 per cent. on the average value of cargoes (but this assumes that the vessels are loaded to their utmost capacity), while the saving in insurance over the Cape of Good Hope route is 1½ per cent., so that the saving in insurance alone, over the amount of the tolls, is equal to one-half of the tolls.

Train Accidents in July.

On the morning of the 1st, near Mendota, Ill., on the Chicago, Burlington & Quincy Railroad, a west-bound passenger train ran into a pile of rocks which some one had placed upon the center of the track, throwing the locomotive from the track and injuring it considerably.

On the morning of the 1st, the engine of a passenger train on the Chicago, Burlington & Quincy Railroad jumped the track and was delayed two hours.

On the morning of the 1st, near Meigs Junction, O., on the Pittsburgh, Cincinnati & St. Louis Railway, there was a collision between two freight trains, by which the track was torn up considerably and some delay was caused.

On the afternoon of the 1st, a switching engine on the Burlington, Cedar Rapids & Minnesota Railroad jumped the track in Burlington, Iowa, and stuck in soft ground on the bank of the Mississippi. Too fast running on bad track is given as the explanation of the mishap.

On the afternoon of the 1st on a side track or short branch of the Quincy, Alton & St. Louis Railway, leading from Millville, Ill., to some quarries, a construction train ran off where the track was bad, and was not re-railed (partly on account of bad weather) for 24 hours.

On the morning of the 2d, as a south-bound mail train on the Harlem Extension Railroad (now New York, Boston & Montreal) was taking a siding at Clarendon station, the guard rail turned in and dragged the engine from the track, disabling it for the time.

On the morning of the 2d, near Reigelsville, N.J., on the Belvidere Delaware Railway, a locomotive without a train ran into the rear of a passenger train which was waiting on a curve for the arrival of another train ten minutes behind time. The rear car was thrown from the track, but little other damage was done.

At noon on the 2d, a locomotive of the Rensselaer & Saratoga Railroad ran off the track north of their depot in Troy, N.Y.

On the 2d, at Winchester, Mass., on the Boston & Lowell Railroad, a misplaced switch caused a collision between freight

trains by which a conductor had his thigh broken and was badly scalded, and several cars were badly broken.

On the 2d, there was a collision between an ore train and a construction train on the Hudson Branch of the Boston & Albany Railroad, between Claverack and Mellenville, by which six persons were injured, one of them fatally.

On the afternoon of the 2d, an axle broke under a passenger car of a west-bound train on the Morris & Essex Division of the Delaware, Lackawanna & Western Railroad, near Newark, N.J., delaying the train some time, but doing no serious damage.

On the morning of the 3d, near Englewood, Ill., on the Chicago, Rock Island & Pacific Railroad, a coupling in a freight train broke and left behind part of the cars, into which a following freight train ran, breaking up the engine and six cars.

On the afternoon of the 4th, as an engine was pushing a passenger train from the Pennsylvania depot in Harrisburg to the Philadelphia & Reading Railroad, a baggage car and two coaches were thrown from the track by a misplaced switch. One of the car platforms was destroyed.

On the evening of the 4th, a west-bound passenger train on the Pacific Railroad of Missouri ran against a tree which had been blown across the track a mile west of Gasconade River, throwing the locomotive, tender, baggage car and two coaches from the track, and injuring the engineer and fireman. The road was blocked five or six hours.

On the morning of the 5th, about 2 o'clock, just west of Concord, Mich., on the Michigan Central Railroad, nine cars of a stock train were thrown from the track by a broken rail and utterly wrecked, killing a large number of horses, and about half the hogs in seven car-loads.

Early in the morning on the 5th, an east-bound train on the Erie Railway broke in two, and the sections ran together near Sloatsburg so that a truck ran across to the opposite track.

Before a flag could be put out for this obstruction, a west-bound train struck the truck and was thrown bottom up into a creek.

On the 5th, at Havana, N. Y., on the Northern Central Railway, a passenger train ran into a freight train which was standing on the main track and had no flagman out. The engineer and fireman of the passenger train were somewhat injured.

A little after noon on the 5th, near Bainbridge, Pa., on the Columbia Branch of the Pennsylvania Railroad, there was a collision between east and west bound fast freight trains by which both engines were pretty badly damaged, and the road was blocked about two hours. Both engineers reversed and then jumped and were very little hurt.

On the afternoon of the 5th, in the yard of the Pittsburgh, Washington & Baltimore Railway, in Pittsburgh, Pa., a locomotive jumped the track as it was running into the round house. The throttle was opened well to help it back when the engine plunged forward and struck and knocked down the principal support of the roof, which immediately fell, damaging four locomotives in their stalls, and doing injury altogether amounting to about \$13,000.

On the morning of the 6th, near Rockville, Pa., five miles west of Harrisburg, on the Middle Division of the Pennsylvania Railroad, a north-bound mail train ran into the rear of a north-bound express freight train which was standing at a water station, owing, it is reported, to the carelessness of the flagman of the freight train. The caboose of the freight and two or three car-loads of merchandise were broken up, and the engine of the mail train was thrown from the track badly damaged, and the tender, baggage-car and one coach also. The road was blocked about two and a half hours.

On the 7th, at Portageville, N. Y., on the Attica Branch of the Erie Railway, as a mail train was standing close in rear of a freight train, a second freight train ran into the rear of the mail and forced it into the freight ahead, damaging both ends of it and injuring four persons.

On the afternoon of the 7th, near Springfield, Mass., on the Connecticut River Railroad, there was a butting collision between a switching and a gravel train, both moving rapidly around a curve, by which two workmen received serious injuries.

On the night of the 7th, in the yard of the Chicago, Rock Island & Pacific Railroad at Des Moines, Iowa, as a freight train was pulling in, a switching engine, carelessly handled, ran into it. Both were moving very slowly, and scarcely any injury was done—except to the reputations of the men in fault.

On the night of the 7th, just above Vincennes, Ind., on the Indianapolis & Vincennes Railroad, a mail train ran into a freight train which was standing on a side track, breaking up several freight cars and the locomotive of the mail train.

On the night of the 7th, near Ogden, Ill., on the Indianapolis, Bloomington & Western Railway, the engine of a freight train was overturned by the spreading of the rails, and the engineer was severely injured and the fireman and a brakeman were pinned fast and slowly scalded to death.

On the 8th, on the Sioux City & St. Paul Railroad, two miles east of Hersey, Minn., as a gravel train was being pushed up the track the caboose and two flat cars flew off the track, and the caboose was pushed upon its end. There were 47 men in the caboose, 42 of whom were more or less injured, some of them severely.

On the morning of the 9th, half a mile west of Boca, Nevada, on the Central Pacific Railroad, as a locomotive, tender and caboose were going down a grade, the engine struck a rock which had rolled upon the track and the locomotive was thrown down a bank twelve feet high and landed on its back. The engineer jumped and the fireman went down with the engine, and neither was hurt.

On the morning of the 9th, at Culver's, a few miles south of Lafayette, Ind., on the Indianapolis, Cincinnati & Lafayette Railroad, a north-bound express train ran into the head of a passenger train which was waiting for it. A freight train occupied the siding, and had ordered out a brakeman to flag the north-bound train, but this brakeman neglected to do his duty. Both engines and three baggage cars were badly wrecked and the road blocked several hours. The engineer of the moving train, who jumped, and his fireman, who remained on the engine, were injured, and also the express messenger.

On the 9th, early in the morning, as an express train on the Pennsylvania Railroad was running westward near Lancaster, one of the parallel rods broke and the engineer was struck and seriously injured.

On the evening of the 9th, at Champion, Mich., on the Marquette, Houghton & Ontonagon Railroad, a locomotive and a full train of ore were thrown into the ditch.

On the evening of the 10th, at the quarries near Joliet, Ill., on the Chicago, Rock Island & Pacific Railroad, there was a collision between an accommodation and a freight train, by which the engine and baggage car of the accommodation and a flat of the freight were ditched, and the engine totally wrecked. The engineer was injured.

On the evening of the 10th, in Jersey City, on the New York Division of the Pennsylvania Railroad, there was a collision between the locomotive going in to take out a train and a train of empty passenger cars, on a switch between Hudson and Greene streets, by which two cars were wrecked and thrown from the track, and slight injury was done to the locomotive.

On the evening of the 10th, half a mile west of Laclede, Mo., on the Pacific Railroad of Missouri, there was a collision between a west-bound accommodation train and an east-bound express, by which the engineer of the latter train was seriously hurt. There was not much damage to the engines. "Difference of time in the watches of the engineer" is given as the cause.

On the morning of the 11th, at Conner's Station, on the Pacific Railroad of Missouri, a north-bound mail train struck some cattle near a bridge, and two coaches were thrown from the track. The air brake stopped the train just as the baggage car reached the bridge. The road was blocked some hours.

On the forenoon of the 11th, near Capron, Ill., on the Kenosha & Rockford Division of the Chicago & Northwestern Railway, an excursion train ran into a hand-car loaded with iron, by which the engine and a caboose car were thrown from the track. The road was blocked about four hours.

On the 11th, a switching engine on the New York Division of the Pennsylvania Railroad in Jersey City broke its machinery so as to be beyond control, and then ran up the track and into the head of a freight train, badly wrecking both engines, the men on which saved themselves by jumping.

On the 11th, near Foster's, Ohio, on the Little Miami Railroad, there was a collision between two passenger trains, by which an engineman was badly hurt.

On the morning of the 12th, near New River Bridge, Va., on the Atlantic, Mississippi & Ohio Railroad, the sleeping car of an east-bound passenger train jumped the track and rolled down a low embankment, killing a brakeman and breaking a leg of the sleeping-car conductor, while six passengers were less seriously hurt.

On the afternoon of the 12th, at Randolph, Mass., on the Old Colony Railroad, several cars of a freight train were thrown from the track by the overturning of a rail, blocking the road an hour and a half.

On the afternoon of the 12th, a north-bound passenger train from Plymouth on the Old Colony Railroad was passing through Dorchester, Mass., it went through closed crossing-gates and a balky horse which was standing on the track, damaging the engine somewhat, but not throwing any part of the train from the track.

On the afternoon of the 12th, at Frankford Junction, Pa., on the New York Division of the Pennsylvania Railroad, the locomotive, tender and several cars of a freight train were thrown from the track, and the engine and four cars were completely wrecked. The fireman was dangerously scalded and the engineman badly bruised. The cause is supposed to have been a plank left either on the track or so close and so high as to strike the engine.

On the night of the 12th, two cars of a passenger train on the Nashville Division of the St. Louis & Southeastern Railway were thrown from the track near Henderson, Ky., injuring 10 persons, but none dangerously. The rear truck of the sleeping car first left the track, and this dragged the sleeping car and the coach ahead down the bank. A low joint is supposed to have caused the accident.

On the night of the 12th, at East Louisiana, or Pike Station, on the Louisiana Branch of the Chicago & Alton Railroad, a passenger train ran off the track at a switch, and the locomotive turned over. The track was blocked twelve hours or more.

On the 13th, a switching engine on the Pennsylvania Railroad was thrown from the track by a misplaced switch near the depot in Harrisburg.

On the morning of the 14th, near Moonville, O., on the Marietta & Cincinnati Railroad, there was a collision between an accommodation and a freight train by which three persons were killed.

On the morning of the 14th, at Slade's switch, about five miles from Buffalo, on the Erie Railway, a west-bound passenger train ran at a rapid rate into an engine and flat car loaded with workmen, which were waiting for the passenger train to take the siding, according to rule. There was a blinding storm at the time, and the engineman of the passenger train says that he could not see the siding or gravel train. Both engines were nearly ruined, and eleven men on the working train were injured, four of them severely.

On the 14th, at Titusville, N. J., on the Belvidere Delaware Railroad, two cars of a coal train were thrown from the track and their contents dumped into the canal, and other cars thrown down the opposite bank.

On the 14th, at Knight's Mills, on the Eastern Railroad, nine cars of a freight train were thrown from the track and badly broken up.

On the morning of the 15th, both parallel rods broke on the engine of a west-bound express train of the Lake Shore & Michigan Southern Railway, near Breckon, N. Y.

On the 15th, as a Lake Shore & Michigan Southern gravel train was coming out of a gravel pit on the Buffalo, Corry & Pittsburgh Railroad, half a mile from Brocton, N. Y., it broke in two, and the rear part ran back down the hill into a freight train in the Buffalo, Corry & Pittsburgh yard, damaging four or five cars.

About 2 o'clock on the afternoon of the 15th, the east-bound Binghamton express on the Morris & Essex Division of the Delaware, Lackawanna & Western Railroad ran into a coal train which was being switched across the track to a siding at Port Oram, N. J. The express engine ran through the coal train, wrecking several cars. The engine and cars of the express were somewhat damaged. The coal train had no signal out, though the express was due at the time. The engineman jumped and was not hurt. The fireman remained on the engine and was badly hurt.

On the afternoon of the 15th, as an oil train with 26 loaded cars was passing over the "hogsback" on the Dunkirk, Allegheny Valley & Pittsburgh Railroad, a mile from the Dunkirk depot, the track to which goes down a grade of 74 feet to the mile, the cars in the rear broke off, leaving but one brakeman with the 16 cars in front, which could not be controlled, but ran down at great speed in spite of a reversed engine. An engine taking coal was in the way on the main track, but its engineman backed it till he found he was likely to run into difficulty at the Erie switch, when he reversed and jumped, and his engine went to meet the oil train, which struck it and pushed it down again. The magnificent locomotive "Jay Gould," just completed for the New Jersey Southern by the Brooks Locomotive Works, had just returned to the depot from its trial trip, Mr. H. G. Brooks, President of the Works, running it. It stood in the way and was struck with such force as to send the manhole plate of the tender up into the timbers of the depot. Mr. Brooks stuck to it, however, and, after starting forward a little, by a prompt reversal brought the three engines and 16 cars to a stand. Less than \$500 damage was done to the three locomotives. The object of the engineman with the coal engine was to cause the inevitable collision to take place outside of the depot, which was crowded with people who came to see the "Jay Gould." Mr. Brooks' courage and presence of mind in stopping the runaway was acknowledged in a letter from the Superintendent of the Dunkirk & Pittsburgh road. If a switch had not been open to let the "Jay Gould" pass upon the Erie track, the runaway would probably have been thrown, oil and all, upon a passenger train just arrived on the Lake Shore road.

On the afternoon of the 15th, near Martinsburg, Va., on the Baltimore & Ohio Railroad, a stay-bolt blew out from the boiler of a locomotive and dangerously scalded the fireman.

On the night of the 15th, near Erie, Pa., on the Lake Shore & Michigan Southern Railway, a west-bound express train ran into the rear of a freight, destroying the caboose and injuring slightly the locomotive of the express.

Early in the morning of the 16th, an express train on the Lake Shore & Michigan Southern Railway ran into a freight train on the main track at Harbor Creek, telescoping the caboose and two freight cars, and fatally injuring the fireman of the express.

On the 17th, as two extra freight trains on the Marietta & Cincinnati Railroad were running eastward close together, near Vinton, O., a part of the front one broke loose and the rear train ran into the cars broken off, killing the fireman and a brakeman.

On the evening of the 17th, at the crossing of Twelfth street in Chicago, on the Lake Shore & Michigan Southern Railway, a

south-bound passenger train ran into the end of a freight car which projected a little distance from the mouth of a switch, damaging the locomotive slightly.

On the morning of the 18th, the locomotive of a freight train was thrown from the track of the Western Division of the Toledo, Peoria & Warsaw Railway.

On the morning of the 18th, at Watertown, Wis., on the Wisconsin Division of the Chicago & Northwestern Railway, a north-bound freight train ran into the rear coach of a passenger train on the Milwaukee & St. Paul Railway which had just started for Milwaukee. The cow-catcher and head-light were knocked from the locomotive and the coach was thrown from the track and tipped partly over.

On the afternoon of the 18th, at the Lake Shore & Michigan Southern transfer house in Buffalo, N. Y., there was a collision between a freight train backing out and one going in, by which one engine was badly damaged and several cars were thrown from the track.

On the night of the 18th, in the "Blue Cut," a mile west of Lyons, N. Y., on the New York Central & Hudson River Railroad, an east-bound express train struck a land-slide and was thrown by it upon the opposite track, and

It hardly landed as it was struck by the locomotive of a west-bound freight train, badly damaging both engines and ten or twelve cars, and blocking the road about twelve hours. In both cases the men on the engines saved themselves by jumping.

About 3 o'clock in the morning, on the 19th, at Morris Station, N. J., on the Belvidere Delaware Railroad, there was a butting collision between an empty and a loaded coal train, by which both engines were damaged and a great many cars wrecked. It is reported that some one's neglect to deliver an order occasioned the accident.

On the afternoon of the 19th, as an express train on the Norristown Branch of the Philadelphia & Reading road was passing Falls Station, the engine was thrown from the track, which was covered with sand washed over it by heavy rain. The engine ran along 100 feet, wrecking the platform of the station, and then turned around and upset, throwing the baggage car and one passenger car on the other track. The engineman was thrown down an embankment, but recovering himself went to the engine and succeeded in putting out the fire.

On the night of the 19th, at Churchville, N. Y., on the New York Central & Hudson River Railroad, six car-loads of corn on an east-bound freight train were thrown from the track and piled up in a wreck.

On the night of the 19th, at Lyons, N. Y., on the New York Central & Hudson River Railroad, a west-bound express train was thrown from the track and plunged into a freight train which was standing on a siding, wrecking the engine, baggage car and express car, and breaking somewhat the coaches.

On the night of the 19th, near Camillus, N. Y., on the Auburn Branch of the New York Central & Hudson River Railroad, an east-bound passenger train was thrown from the track by a land-slide, causing a general wreck.

On the afternoon of the 21st, near Bristol, R. I., on the Providence, Warren & Bristol Railroad, a passenger train ran into a herd of cattle, throwing the locomotive and one car from the track and killing the engineman.

On the night of the 21st, between Anita and Adair, Iowa, on the Chicago, Rock Island & Pacific Railroad, highway robbers removed a rail from the track just in front of an east-bound express train, by which an engine was thrown from the track and the engineman, who had put on air brakes and reversed and so greatly brought down the speed of the train, was instantly killed.

On the 22d, as a passenger train on the Memphis & Little Rock Railroad was just starting from Little Rock, the engine and tender ran off the track and down the embankment.

On the morning of the 23d, at the crossing of the Atchison branch of the Chicago & Southwestern and the Kansas City, St. Joseph & Council Bluffs Railroad, opposite Atchison, Kan., a Rock Island freight train ran into a Kansas City switching train, ditching a freight car but doing little other damage.

On the morning of the 23d, five or six freight cars on the St. Paul & Sioux City Railroad were thrown from the track by a misplaced switch while backing along some trestle work on the levee in St. Paul.

On the night of the 23d, on the Northern Division of the Vermont Central Railroad, at its junction with the Stanstead, Shefford & Chamby Railroad, three miles from St. Johns, Quebec, six cars of a south-bound passenger train were thrown from the track by a broken switch-rod, and the train was delayed more than two hours.

Early in the morning of the 25th, at Washingtonville, N. Y., on the Newburgh Branch of the Erie Railway, a coal train broke through a bridge, owing to a misplaced switch, the report says.

On the forenoon of the 25th, just above Bridgeport, Pa., on the Cumberland Valley Railroad, a car-load of grain was thrown from the track and badly broken at a switch.

On the morning of the 26th, at Bethel, Vt., on the Vermont Central Railroad, a locomotive ran into the rear of a freight train, breaking up the caboose of the freight and damaging the attacking engine badly.

On the morning of the 26th, at Sterling, Ill., on the Chicago & NorthWestern Railway, a west-bound freight train ran into another freight train that was standing on the track, badly damaging four or five cars.

On the evening of the 26th, two spans of a bridge on the European & North American Railroad, between Old Town and Milford, Me., were blown away by a tornado, and an engine and tender with five men which attempted to cross shortly after, it being pitch dark, went into the river. The engineman was killed.

In the morning of the 27th, two miles east of Altamont, W. Va., on the Baltimore & Ohio Railroad, as a convoy of freight trains was going down a steep grade, the mogul locomotive on one broke lose, got beyond control and ran at the rate of 40 miles an hour into the rear of a freight train ahead, destroying twenty loaded cars, badly injuring the conductor and a brakeman who were in the caboose of the freight train, and killing two drivers in the caboose and the engineman of the runaway train.

On the morning of the 27th, at Rutland, Vt., on the Rensselaer & Saratoga Railroad, the locomotive of a freight train jumped the track on a very short curve.

On the 28th, in the forenoon, at Nashua, N. H., on the Boston Lowell & Nashua Railroad, eight or ten cars of a freight train were thrown from the track by the breaking of a bunter and badly broken up.

On the 28th, at Morrisville, Pa., on the New York Division of the Pennsylvania Railroad, a journal broke under a car loaded with lumber, and a number of flats loaded with lumber were wrecked.

On the morning of the 29th, a freight train on the Indianapolis, Bloomington & Western Railway was wrecked near Liston.

On the evening of the 29th, about two miles from Buffalo, N. Y., on the Niagara Falls Branch of the Erie Railway, at the crossing of the Buffalo, New York & Philadelphia Railroad, an Erie express train from the Falls ran into the rear car of an outward-bound Buffalo, New York & Philadelphia train, turning over and badly damaging the rear coach and injuring eleven passengers and a brakeman, one of them fatally. The Erie train-men claim that the signal for a clear crossing was out, while the men of the other road are positive that the danger signal was out.

On the morning of the 30th, on the branch of the Quincy, Alton & St. Louis Railroad, under construction from Fall Creek, Ill., to Hannibal Bridge, as a construction train was

backing toward Hannibal, a tree which some woodchoppers were felling fell directly across the train, breaking cars and sweeping off men and ties in one mass. Six persons were injured. The choppers waited long enough to see part of the mischief they had done, and then made good time toward the Mississippi River, probably intending to escape into Missouri.

On the morning of the 30th, at Port Oram, N. J., on the Morris & Essex Division of the Delaware, Lackawanna & Western Railroad, a coal train was thrown from the track and the road blocked thereby about two hours.

On the afternoon of the 30th, in Buffalo, N. Y., a train of coal cars was backed up the track of the Lockport line of the New York Central & Hudson River Railroad at a rapid rate, in order to obtain momentum for the ascent of a trestle-work at a coal yard where the cars were to be unloaded. A switch had been left open which turned the train upon a siding, where they struck a freight engine and box car, damaging the engine and several cars.

Early in the month, as a freight train was passing over some trestle-work on the Pennsylvania Railroad, near Philadelphia, the locomotive and five cars loaded with petroleum fell through, and the oil caught fire, badly burning two traumae, one of them fatally.

This is a total of 90 accidents, which may be classified approximately as to their nature and causes as follows:

DERAILMENTS.	
Unexplained.	16
Accidental obstruction.	8
Misplaced switch.	4
Cattle on track.	2
Bad track.	2
Spreading of rails.	1
Low joint.	1
Rail turning over.	1
Turning of guard rail.	1
Broken rail.	1
Malicious removal of rail.	1
Broken switch rod.	1
Failure of trestle.	1
Breaking of bunter.	1
Bridge blown away.	1
Broken journal.	1
Malicious obstruction.	1—44

COLLISIONS.	
Rear collisions (or collisions with standing trains).	16
Head collisions.	9
Crossing collisions.	4
Unexplained.	10—39
Broken parallel rods.	2
Stay-bolt blowing out.	1
Tree falling on train.	1
Running through closed gates.	1
Unexplained.	1

Total 90

This classification is necessarily somewhat crude, but we try to indicate by it as definitely as possible the proximate cause of each accident, and so we have not infrequently a general cause assigned which will cover several cases of a particular kind; as in the account of derailments there are two assigned to "bad track," which term will also cover low joint, spreading of rails, turning of rails, and breaking of rail. In what we have termed "head" collisions we include collisions of two trains moving toward each other, whichever end may be foremost; and our "rear" collisions cover all collisions of one train running into either end of a standing train, as well as of one train, or part of a train, running into the rear of another moving train.

Besides the four cases of derailments caused by misplaced switches, two collisions (one rear and one unknown) were due to the same fault. Two of the rear collisions were due to a neglect to flag, and a number larger even than usual to the breaking of couplings, sometimes followed by the running away of a part of the train.

There were seven such accidents caused by trains breaking in two, three of which were followed by runaways, and there was one runaway caused by such a breakage of the engine as to make it impossible to control it. No less than eight derailments were caused by accidental obstructions, and in two cases these obstructions consisted of trains which had got off their track and partly upon the opposite track of a double-track road—a kind of accident which is likely to become more frequent with the increase of double-track roads and the growth of their traffic. When there are trains each way at very short intervals, a train which runs off toward the opposite track is quite likely to cause an accident which no care can prevent; the prevention must consist in keeping all trains on the tracks at all times. Four other accidental obstructions consisted in the falling or washing of earth or rock upon the track, one in the blowing down of a tree, and one in the careless leaving or accidental falling of a plank. Besides the derailments so caused, there was one case in which a tree was carelessly felled directly upon a passing train.

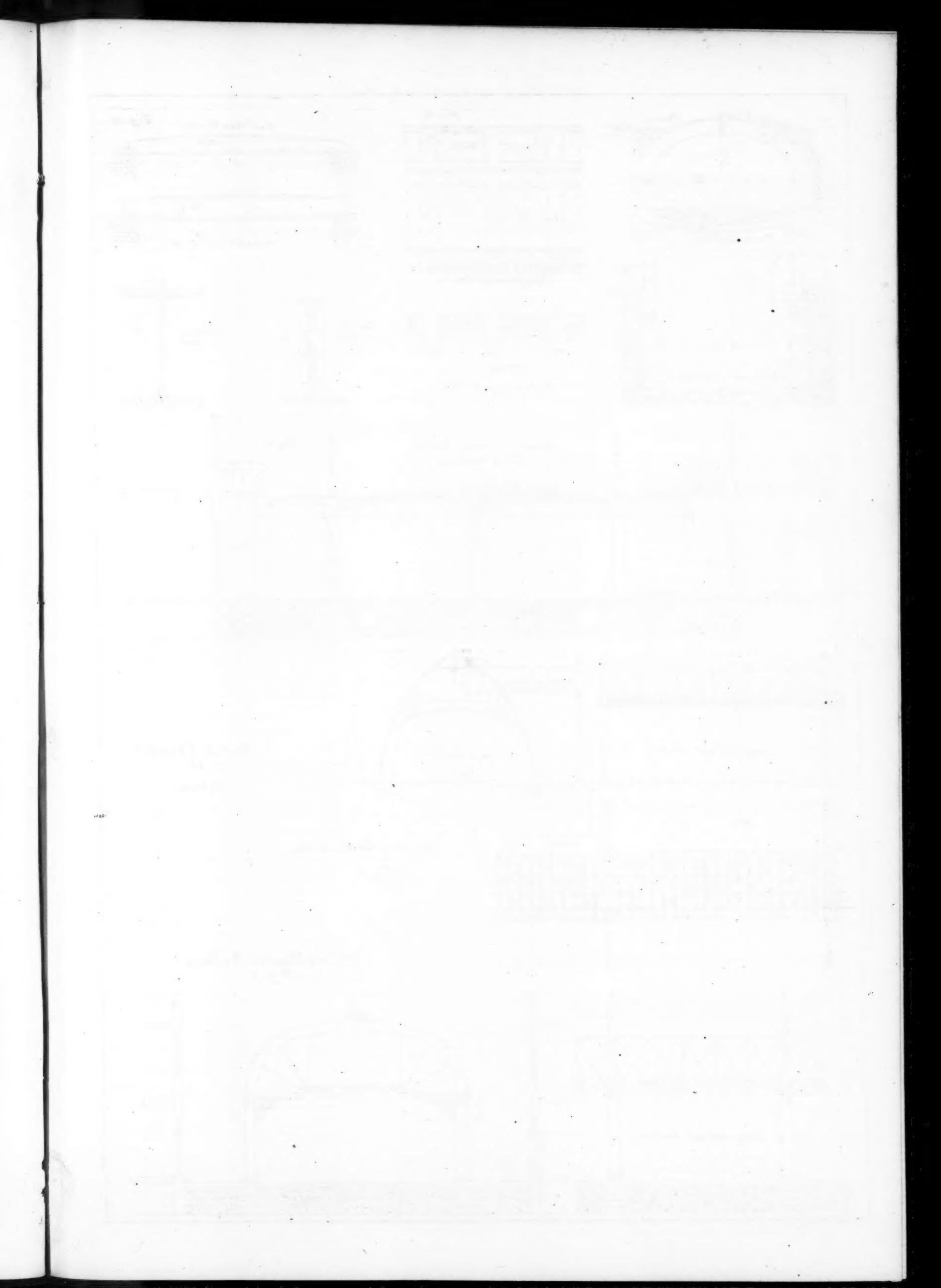
Eleven of the accidents can be traced to defects or failures of permanent way, and twelve (including those with broken couplings) to defects or failures of rolling stock.

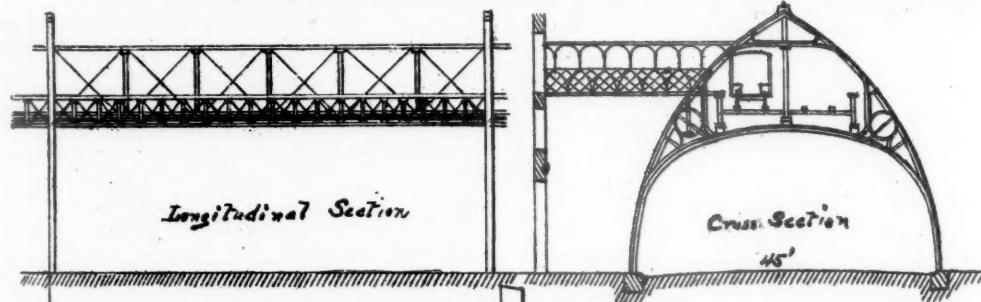
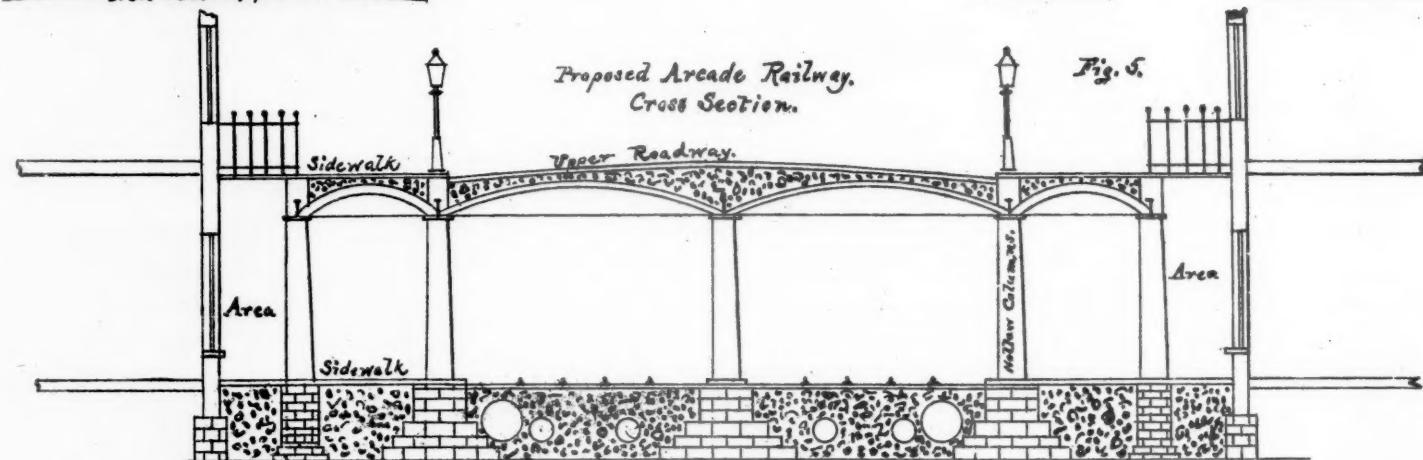
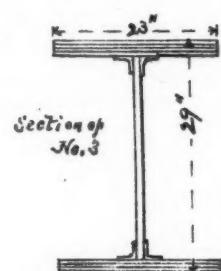
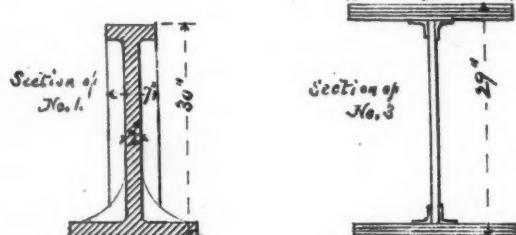
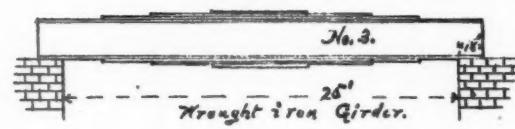
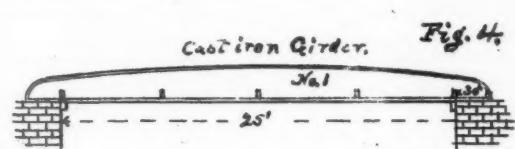
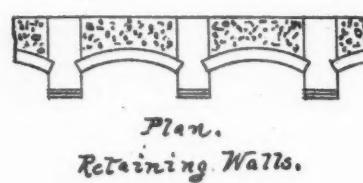
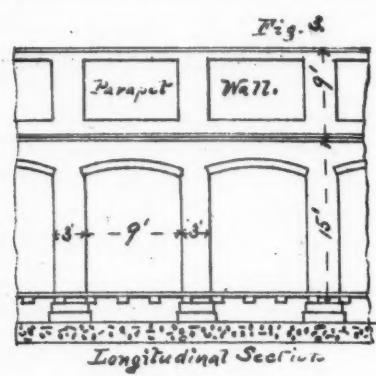
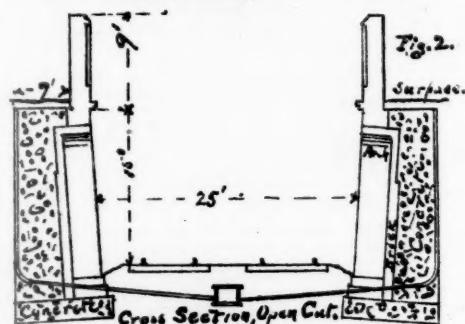
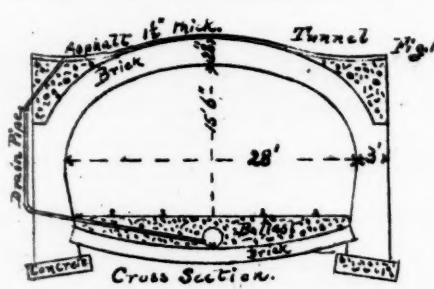
These ninety accidents caused the death of 18 and the injury of 119 persons. It is noticeable that at least two of the deaths and not less than 59 of the injuries were in accidents to construction trains; and it may be said generally that a vast disproportion of the fatal accidents are to such trains generally.

This is not only due to the fact that such trains carry the pioneers over unfinished and unprepared lines, but also largely, we fear, to the fact that they are intrusted to unskilled or the least skilled trainmen, and not infrequently to men who are not trainmen at all, but contractors' men or trackmen, who, however well they may happen to understand the running of trains in the abstract, scarcely ever are fully instructed in the rules of the road or drilled in its discipline.

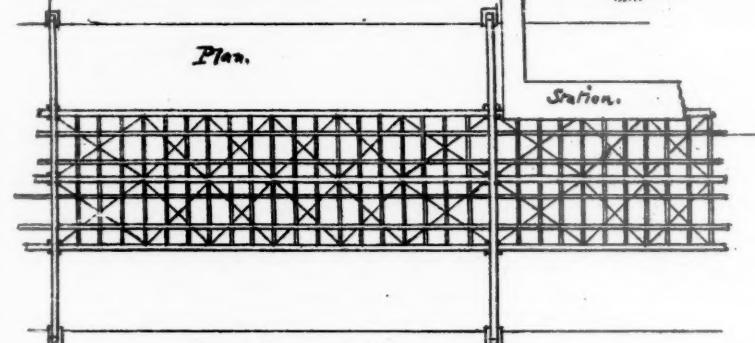
For the twelve months ending with July our record stands as follows:

Month.	Accidents.	Killed.	Injured.
August, 1872.....	63	15	49
September.....	71	24	104
October.....	90	29	102
November.....	103	37	114
December.....	112	42	133
January, 1873.....	178	40	199
February.....	133	25	126
March.....	112	18	92
April.....	101	23	88
May.....	79	10	113
June.....	90	12	104
July.....	90	18	119
Totals.....	1,222	293	1,343





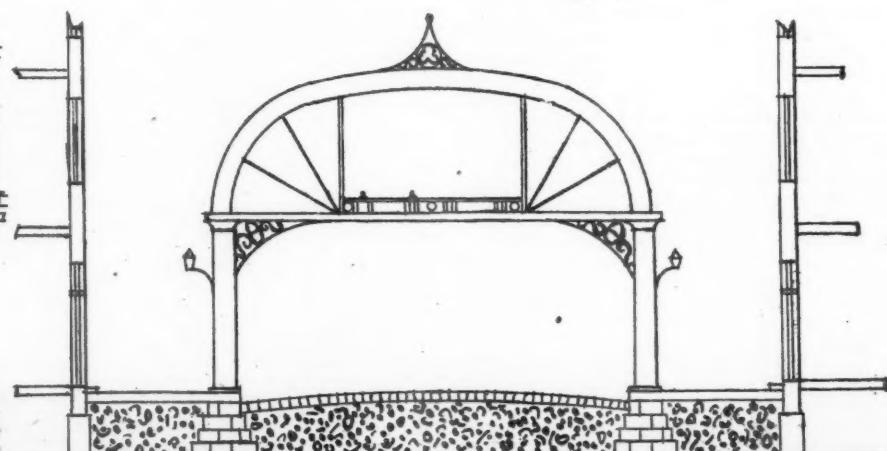
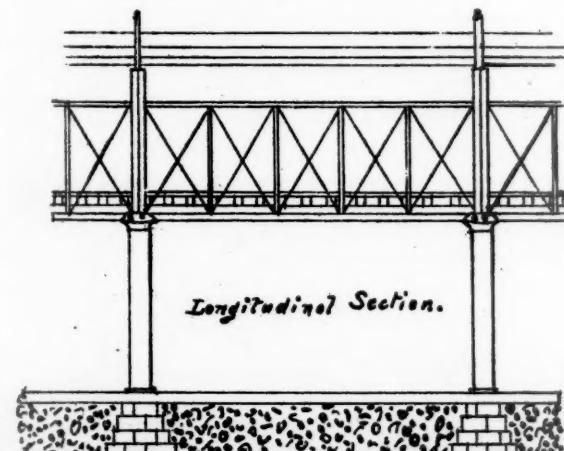
RAPID TRANSIT
IN
CITIES.



Elevated Gothic Arch.

Fig. 6.

Gilbert Elevated Railway
Fig. 7.



Last year we reported for July 31 accidents with 35 killed and 66 injured.

The average number of accidents per day, according to our imperfect reports, since the beginning of the current year have been: January, 5.74; February, 4.75; March, 3.61; April, 3.37; May, 2.55; June, 3.00; July, 2.90; for the summer months, 3.69.

Traveling on the Hudson River in 1808.

The first steamboat on the Hudson River passed the City of Hudson on the 17th of August, 1807. In the *Hudson Bee*, a newspaper of that city, the following advertisement was published in June, 1808:

STEAMBOAT.

For the Information of the Public.

The Steamboat will leave New York for Albany every Saturday afternoon, exactly at 6 o'clock, and will pass

West Point about 4 o'clock Sunday morning.

Newburgh, 7 o'clock Sunday morning.

Poughkeepsie, 11 o'clock Sunday morning.

Eopus, 2 o'clock in the afternoon.

Red Hook, 4 o'clock in the afternoon.

Catskill, 7 o'clock in the afternoon.

Hudson, 9 o'clock in the evening.

She will leave Albany for New York every Wednesday morning, exactly at 8 o'clock, and pass

Hudson about 3 in the afternoon.

Eopus, 8 in the evening.

Poughkeepsie, 12 at night.

Newburgh, 4 Thursday morning.

West Point, 7 Thursday morning.

As the time at which the boat may arrive at the different places above mentioned may vary an hour more or less, according to the advantage or disadvantage of wind and tide, those who wish to come on board will see the necessity of being on the spot an hour before the time. Persons wishing to come on board from any other landing than those here specified can calculate the time the boat will pass, and be ready on her arrival. Innkeepers or boatmen who bring passengers on board or take them ashore from any part of the river will be allowed one shilling for each person.

PRICES OF PASSAGE—FROM NEW YORK.

To West Point.....	\$2.50 To Red Hook.....	4.50
Newburgh.....	3.00 Hudson.....	5.00
Poughkeepsie.....	3.50 Albany.....	7.00
Eopus.....	4.00	

FROM ALBANY.

To Hudson.....	\$2.00 To Poughkeepsie.....	4.00
R. d. Book.....	3.00 Newburgh and W. Point.....	4.50
Eopus.....	3.50 New York.....	7.00

All other passengers are to pay at the rate of \$1 for every twenty miles, and a half dollar for every meal they eat.

Children, from one to five years of age, to pay one-third price, and sleep with the persons under whose care they are.

Young persons, from five to fifteen years of age, to pay half price, provided they sleep two in a berth, and whole price for each one who requests to occupy a whole berth.

Servants who pay two-thirds price are entitled to a berth; they pay half price if they do not have berth.

Every person paying full price is allowed 60 pounds of baggage; if less than whole price, 40 pounds. They are to pay at the rate of 3 cents a pound for surplus baggage. Storekeepers who wish to carry light and valuable merchandise can be accommodated on paying 3 cents a pound.

Passengers will breakfast before they come on board. Dinner will be served up exactly at 1 o'clock; tea, with meats, which is also supper, at 8 in the evening, and breakfast at 9 in the morning. No one has a claim on the steward for victuals at any other time.

CHICAGO RAILROAD NEWS.

Chicago, Danville & Vincennes.

Property-owners in the towns of Worth and Lake, in Cook County, are trying to induce this company to construct a line of its own from Dolton to Chicago, instead of running over the 20 miles of the Pittsburgh, Cincinnati & St. Louis Railway, as at present. They would have the line three or four miles west of the track now used. The company intimates that it will make the line if those interested in property on the route will pay \$120,000 toward its cost. As a railroad would enable the owners of farms to turn them into suburban lots, they, of course, are greatly interested in the matter. The railroads in that vicinity are too near together to leave much ordinary traffic for a new line close by, and the chief value of an independent line to the company would be the suburban traffic which might spring up on it. If such a line is constructed, we understand that it will probably join the old line three or four miles south of Dolton, run thence northwest through Blue Island, and thence northward, perhaps along the line of some existing road.

Illinois Central.

This company reports as follows its receipts for July:

Land Department.

Acres construction land sold.....	2,231.81 for \$18,331.15
Acres free lands sold.....	40 for 640.00
Total sales during the month of July, 1873....	2,274.81 for \$19,021.15
Total of all.....	2,274.81 for \$19,021.15

Cash collected in July, 1873..... \$36,545.05

Estimated Earnings—Traffic Department.

	In Illinois. 767 Miles.	In Iowa. 402 Miles.	Total. 1,109 Miles.
Freight.....	\$353,319.00	\$1,848.00	\$353,167.00
Passengers.....	111,199.35	39,476.15	150,675.40
Mails.....	6,375.00	3,059.24	9,434.24
Other sources.....	75,125.00	2,515.76	77,640.76
Total, July, 1873.....	\$546,018.35	\$126,899.15	\$672,917.40
Total actual earnings, July, 72.....	499,669.36	110,776.97	609,446.33
Increase.....	\$16,948.89	\$16,122.18	\$33,071.07

This is an increase of 9½ per cent. on the Illinois earnings, 14½ per cent. on the Iowa earnings, and 10½ per cent. on the total earnings.

Refrigerator Car Traffic.

The Blue Line has been shipping in refrigerator cars from five to seven car-loads of butter to New York and Boston. The car is kept at a temperature of about 40 degrees, which enables shipments to be made as safely as in winter. First-class rates are charged, which amounts to \$1.35 to Boston and \$1.25 to New York at present. This is but a trifle for butter to pay, making less than 1½ cents per pound, and the farmer does not feel the charge of \$250 on \$5,000 worth of butter nearly as

much as a charge of \$90 on \$120 worth of corn—each making a car-load. The increase in the exports of dairy products, especially from Northern Illinois and Wisconsin, is one of the most notable features in the development of farm business in the Northwest, and is partly owing to the manufacture of fine qualities of butter and cheese, and partly to the increase of wealth among farmers which enables them to stock their farms which formerly were devoted to grain. This tendency, however, is not favorable to the railroad companies, for though dairy products can afford to and do pay a very much larger profit per car-load, they make very much fewer car-loads. There are counties now in Northern Illinois which export much less weight of agricultural produce than they did ten years ago, though the value of such produce may have nearly doubled. A Chicago firm also ships three car-loads of dressed beef daily by the refrigerator cars.

Chicago, Burlington & Quincy.

The Quincy City Council has granted this company the right of way along the levee to lay a track from a connection with the Quincy, Alton & St. Louis Railroad. This will enable it to run trains to Hannibal direct and connect with the Missouri, Kansas & Texas for Texas.

A through train is to be put on from Chicago to Denison, Texas, running over the Chicago, Burlington & Quincy to Quincy, thence over the Quincy, Alton & St. Louis to Hannibal, and thence over the Missouri, Kansas & Texas.

Arrangements have been made by which the stock trains of the Missouri, Kansas & Texas are to run through to Quincy and the transfers of stock made at the Quincy yards.

General Railroad News.

ELECTIONS AND APPOINTMENTS.

Mr. N. F. Cross, for some years connected with the Hudson River Railroad, has been appointed General Eastern Agent of the Ohio & Mississippi Railroad, with office at 261 Broadway, New York.

Mr. J. C. Stubbs has been appointed General Freight Agent of the Central Pacific, Stockton & Copperopolis, Stockton & Visalia, and California Pacific railroads and steamer lines, the total mileage of these lines being 2,049 miles. Mr. Stubbs has been heretofore Assistant General Freight Agent.

The following are the provisional officers of the Dresden & Oil Springs Railway Company, of Canada: President, Captain James Sisk, Oil Springs, Ont.; Secretary, D. McInnes, Dresden, Ont.; Treasurer, Dr. Clarke, Dresden, Ont.; Solicitor, J. W. Sharpe, Dresden, Ont.

At a meeting of the directors of the Atlantic & Pacific Railroad Company in New York, August 9, J. Edgar Thomson and Thomas A. Scott, of Philadelphia, Alfred L. Dennis, of Newark, N. J., and David Salomon, of New York, were chosen directors to fill vacancies in the board caused by the resignation of Messrs. Billings, Morrill, Bishop and Curtis. Subsequently Thomas A. Scott was chosen President of the company, in place of E. F. Bishop, resigned; Andrew Peirce, Jr., the Vice-President, was appointed also General Manager, and General Clinton B. Fisk, of St. Louis, was chosen Treasurer, in place of A. V. Stout, resigned.

The following appointments of officers for the Chicago & Port Huron Railroad (formed by the consolidation of the Port Huron & Lake Michigan and the Peninsular roads) have been made: General Freight Agent, C. F. Miller; General Ticket Agent, William Stanley; Cashier, A. F. Spencer; Chief Clerk, E. W. C. Neff; Road Master, William Taylor; Assistant Superintendent Eastern Division (Port Huron to Lansing), Thomas Robb; Assistant Superintendent Western Division (Lansing to Valparaiso), Malcolm Black. Mr. Miller has been Superintendent of the Peninsular Railroad.

At the annual meeting of the Central Railroad Company of Iowa, at Marshalltown, Ia., August 4, the following board of

directors was elected: F. M. Sheffield, Dubuque, Ia.; J. B. Grinnell, Grinnell, Ia.; W. H. Seavers, Oskaloosa, Ia.; Horace Abbott, G. H. Kensey, Baltimore, Md.; H. C. Fahnestock, A. L. Hatch, New York; D. N. Pickering, Isaac Hyde, Isaac M. Case, Boston. Messrs. Fahnestock, Pickering and Hyde are new directors, taking the places of W. A. Wheelock, J. D. Donaldson, John S. Gilman and G. M. Woodbury, there being, apparently, one vacancy in the board.

At the annual meeting of the Indianapolis, La Porte & Michigan City Railroad Company at Michigan City, Ind., August 5, the following directors were chosen: David Macy, William Cutting, Heyward Cutting, Jesse S. Leon, Volney T. Mallett, Albert Southard, Henry H. Walker.

At the annual meeting of the Portland & Oxford Central Railroad Company in Portland, Me., August 6, the old board of

directors was re-elected, as follows: F. O. J. Smith, F. B. Smith, Ezra Carter, Dr. Edward Moses, Otis Hayford.

Mr. George W. Stevens has been appointed Master Mechanic of the Michigan Southern Division of the Lake Shore & Michigan Southern Railway, in place of William Hill, resigned. His office and shop are at Elkhart, Ind.

At the annual meeting of the Springfield, Athol & Northwestern (formerly Athol & Enfield) Railroad Company at Athol, Mass., August 4, the old board of directors was re-elected, as follows: Willis Phelps, Homer Foote, W. Birnie, C. R. Ladd, Springfield, Mass.; Edward Smith, Rufus D. Woods, Enfield, Mass.; John C. Hill, Thomas H. Goodspeed, Athol, Mass.; Stephen P. Bailey, Greenwich, Mass.; Samuel Adams, New Salem, Mass.; J. W. Goodman, Dana, Mass. The board subsequently re-elected Willis Phelps, of Springfield, President, and Thomas H. Goodspeed, of Athol, Mass., Clerk and Treasurer.

At the annual meeting of the Burlington & Southwestern Railroad Company recently the following board of directors was chosen for the ensuing year: John Severance, T. D. Weakley, J. Chandler, St. Joseph, Mo.; E. B. Ward, Detroit, Mich.; Henry Sayler, Elijah Smith, Boston, Mass.; W. W. Crapo, W. J. Hatch, Edward D. Mandell, New Bedford, Mass. Messrs. Ward, Hatch and Mandell are new directors, taking the places of John R. Brewer, James B. Thayer and James Putnam.

Mr. Charles Macabe, who has been Chief Assistant in the office of Mr. James Charlton, General Passenger and Ticket Agent of the Chicago & Alton Railroad, has been appointed General Passenger and Ticket Agent of the International & Great Northern Railroad, of Texas, with headquarters at Houston, Texas. Mr. Macabe has for four years occupied his present position with Mr. Charlton, first on the Great Western Railway, of Canada; next on the St. Louis, Kansas City & Northern, and more recently on the Chicago & Alton.

Mr. John W. Sanborn has been appointed Superintendent of the Portsmouth, Great Falls & Conway Railroad.

Mr. Henry F. Sweetser, formerly General Manager of the Atlantic & Great Western Railroad, and who was removed from that position last November on account of alleged frauds, has brought suit for libel against Mr. James B. Hodgskin, Vice-President of the Company, for libel. The libel is contained in the report made by Mr. Hodgskin (at that time Treasurer) to the President of the company. On a recent visit to Meadville, Pa., Mr. Hodgskin was arrested on this charge, but afterwards released on bail. It is also said that Mr. Sweetser proposes to bring suit against the company to recover \$75,000 which he

paid over to the company at the time he gave up the office of General Manager, and which he now claims was paid under duress.

PERSONAL.

Mr. Levi Bissell, the inventor of the Bissell truck, so largely used both in this country and in Europe, died at his residence in New York, August 5. Mr. Bissell, who had reached a great age, had been connected with railroads for many years. His inventions were numerous, and he still continued to study over further improvements in railroad machinery almost up to the time of his death. His truck patent had, we believe, realized for him a considerable amount of money.

Mr. Frank A. Bassler has resigned his position as Superintendent and Treasurer of the Sodus Point & Southern Railroad Company, to accept a position as business manager of the Binghamton (N. Y.) Times.

Mr. Robert Harris, General Superintendent of the Chicago, Burlington & Quincy Railroad Company, is to deliver the address before the McDonough County Agricultural Fair at Macon, Ill., September 4. Macon is a town on Mr. Harris' road, and its people will doubtless expect Mr. Harris to tell them something about railroad tariffs, which he can do very thoroughly, and will at all events do frankly and conscientiously.

H. W. Moore, President of the Union Car-wheel Company, of Jersey City, was thrown from his wagon while riding, on the evening of the 7th, and fatally injured.

Colonel De Graff, the great Minnesota railroad contractor, is reported to have given out invitations to his friends in St. Paul the other day to take dinner with him on his sixty-second birthday, October 21, at Pembina, promising them that they shall go all the way by rail. The same means, doubtless, that Colonel De Graff intends to see the St. Vincent Extension of the St. Paul & Pacific through to the Manitoban border by that date.

TRAFFIC AND EARNINGS.

The gross receipts of the Rockford, Rock Island & St. Louis Railroad for the month of April last were \$64,918.50; the working expenses, rents and taxes, \$57,621.20; net earnings, \$7,297.30. For the 22 months ending with April the gross receipts were \$1,886,571.02, and the net receipts \$417,213.41.

The following companies have published their earnings for the month of July:

	1873.	1872.	Inc.	Dec.	P.C.
Atlantic & Great Western.....	\$428,396	\$417,903	10,493		2%
Atlantic & Pacific.....	116,231	85,344	30,887		36%
B. C. R. & Minn.....	88,637	73,833	14,804		20%
Central Pacific.....	1,211,765	1,272,510			60,745
Chicago & Northwestern.....	1,240,987	1,269,957	211,030		20%
C. C. C. & Ind.....	351,576	326,268	25,308		7%
Erie.....	1,685,384	1,519,911	166,473		11%
Illinois Central.....	672,917	69,846	63,071		10%
Ind. Bloom & Western.....	121,276	100,860	20,416		20%
Kansas Pacific.....	323,233	321,774	1,459		0%
L. S. & Mich. South'n.....	1,451,762	1,223,708	236,054		18%
Marietta & Cincinnati.....	181,663	149,50	32,318		21%
Milwaukee & St. Paul.....	834,320	482,344	315,973		70%
Ohio & Mississippi.....	255,424	222,863	32,563		14%
Pacific of Missouri.....	267,734	265,906	1,828		0%
St. L. A. & T. H. (main line).....	103,841	94,427	9,414		10%
Toledo, Peoria & Warsaw.....	108,038	90,471	17,967		19%
Toledo, Wahab & Webster.....	483,399	432,056	51,343		11%

The following reports of coal traffic for the seven months ending August 2 have been made: On the Lehigh & Susquehanna Division of the Central Railroad of New Jersey: 1873, 1,160,192 tons; 1872, 1,007,148 tons; increase, 153,048 tons, or 15½ per cent.; on the Huntingdon & Broad Top Railroad: 1873, 263,292 tons; 1872, 174,497 tons; increase, 88,795 tons, or 50 per cent.; on the Shamokin Division of the Northern Central Railroad: 1873, 348,699 tons; 1872, 314,027 tons; increase, 34,672 tons, or 11 per cent.; by the Delaware & Hudson Canal Company: 1873, 1,667,066 tons; 1872, 1,723,655 tons; decrease, 56,589 tons, or 3½ per cent.; by the Pennsylvania Coal Company over the Erie Railway: 1873, 697,707 tons;

1873, 51½ per cent.; 1872, 62½ per cent. The earnings per mile were: 1873, \$4,441; 1872, \$3,722; increase, \$719, or 19½ per cent.

The earnings of the Milwaukee & St. Paul Railway for the first week in August were: 1873, \$167,055; 1872, \$91,968; increase, \$75,087, or 81½ per cent.

The earnings of the Great Western Railway of Canada for the week ending July 25 were: 1873, £22,367; 1872, £19,274; increase, £3,093, or 16 per cent.

The earnings of the Grand Trunk Railway of Canada for the week ending July 26 were: 1873, £37,900; 1872, £34,800; increase, £3,100, or 8½ per cent.

The shipments of through freight eastward over the Central Pacific Railroad for the six months ending June 30, 1873, were, from San Francisco, 23,899,335 pounds and from Sacramento and other interior points, 2,655,032 pounds, a total of 26,554,367 pounds, or 1,328 car loads. The shipments for the same period in 1872 were 31,034,056 pounds, and in 1871, 23,797,703 pounds, showing a decrease this year from 1872 of 4,479,689 pounds, or 14 7-16 per cent., and an increase over 1871 of 2,756,664 pounds, or 11½ per cent. The principal items of freight in 1873 were: wool, 13,700,057 pounds; tea, 2,927,434 pounds; coffee, 1,835,588 pounds; wine, 1,682,624 pounds; flour, 1,543,250 pounds; leather, 776,321 pounds.

THE SCRAP HEAP.

Paying Employees with "Savings Bank Checks."

The New York *Tribune* gives the following account of a system of paying employees recently adopted by the South Side Company of Long Island:

"The South Side Railroad Company of Long Island has recently instituted a system of paying its employees with interest-bearing checks called "Savings Bank Checks." Attached to each check are four coupons, one payable at the end of each quarter, the interest being at the rate of 8 per cent., and the ultimate payment being guaranteed by a special deposit of the company's first-mortgage bonds with the New York Safe Deposit Company. The checks are issued in denominations of \$5, \$10, \$20, \$50 and \$100 each, and are exchangeable at the company's office at the convenience of the holders. The checks are of course good for their face upon demand at any time; but if held until the interest coupons become due, will be worth the interest in addition. When the last coupon becomes due the check may be collected, or exchanged for a new one with coupons for another year. There is a reciprocal advantage in this method of payment; but it is believed that it will be especially advantageous to the employees, who will thus be induced to habits of economy. Indeed, the 'Savings Bank Check' is already coming into great favor with them."

Central Pacific Locomotives.

The Sacramento (Cal.) *Record* thus describes the first of 12 new engines now being built in the shops at Sacramento:

"The boiler of this locomotive is 58 inches in diameter and contains 170 2-inch tubes of 11 feet 2 inches in length, and is itself made of Lake Superior iron three-eighths of an inch in thickness, all its seams being double-riveted, and calculated to carry 140 pounds of steam to the square inch, ordinary service pressure. The boiler is fitted with a mud drum underneath, into which the water to make steam is first ejected. By this ingenious arrangement the sediment of the water is deposited below the tubes, and they are thus kept free from incrustations, and their durability considerably increased. This is an arrangement of the mud-drum which was never before made, and is due to the ingenuity of Mr. Stevens. The fire-box is made of Hussey & Wells' steel, 1½ of an inch thick. The cylinders are 17 inches in diameter, and the piston has 24 inches stroke. The driving wheels are 4 feet 9 inches in diameter. Balance slide valves are fitted to the machinery, by which the pressure is relieved and the friction greatly reduced. The fire-box is constructed with an offset so as to admit of the back driving-wheels being set under the boiler, thus shortening the wheel-base, and enabling more weight to be thrown upon them, so that more traction power is obtained. All the forging about the locomotive was made from the scrap iron of the shops, and in this way a superior material was manufactured. The cab of the locomotive, constructed under the eye of J. Turner, foreman of the locomotive wood shops, is made of black walnut and the Mexican wood known as prima vera, making in all a very handsome finish. It is so constructed that all the joints can be taken up in a moment when shrinkage occurs. The tender truck and its frames are all made of iron instead of wood, as is usual. The locomotives are designed by Mr. Stevens, the General Master Mechanic, and the drawings were made by Mr. George Stoddard, draftsman of the road.

A Narrow-Gauge Cattle Guard.

The Manhattan (Kan.) *Nationalist* gives the following "strictly reliable" account of an incident which happened on the line of the Kansas Central:

"A friend who lives on this road gives the experience of a son of Erin—through whose farm the baby road runs—as follows:

"The cattle guards, it seems, are but two feet deep (proportionate to the size of the road) and cattle step down and walk through them. Pat couldn't stand it to have his crops destroyed in this way, so he put in a good pair of bars across the track at the guard, thinking to himself that if he was liberal enough to furnish and put in the bars, the company ought to be accommodating enough to keep them closed. Sure enough, they stopped their train and let down the bars for several days, but like some other folks we know of, they forgot to put them up. This so raised Pat's ire that he was heard to exclaim: 'Be jokers, and if they can't be so accommodating as to keep them up, they shan't come in at all.' He therefore nailed them up good and put up the following notice:

"NOTICE.—Any man or ingle takin down thez bars will be finds for disterin the pese o'f. "PAT O'MARLY."

Inclined Planes on Street Railroads.

The San Francisco *Bulletin* gives the following account of an inclined plane, now nearly finished, which is to give access to a section of that city which has heretofore been without street railroad facilities on account of the very high grades which must be used in order to reach it:

"The inclined plane, commencing at the corner of Clay and Kearny streets and ending at Clay and Jones streets, will be about 2,800 feet long and will overcome an elevation of over 300 feet. The stationary engine—25 horse power—by which the cars will be drawn will be placed at the top of the hill. The wire rope, which will be more than a mile in length, will be three inches in circumference, and made of the best steel wire. Light trucks or dummies will be employed on the grade, to which the cars will be attached while ascending and descending. To each truck is attached an ingenious apparatus by which the rope may be tightly clasped or released at will. The car may by this means be stopped or started by the conductor by a single turn of the wheel which controls the clasp. Three safeguards are provided to render the stoppage of the car practicable and safe. These are so arranged as to take hold of the pavement and support the weight of the car whenever necessary; each car is provided with a common brake which will alone hold it under ordinary circumstances. A third provision is made in the form of an iron shoe 28 inches in length, which

is lowered to the track between the wheels, on which the whole weight of the car may be thrown by the conductor, raising the wheels entirely from the track. Each car will weigh about 2,500 pounds, empty, and about double that with 16 or 18 passengers. Two ascending cars will be attached to the rope at once if one does not reach the top of the hill before another starts from the bottom. At the top of the hill a horse takes the place of the truck and the car is drawn over the remainder of the road."

Burning Coal Dust.

A Mr. Berney, of Jersey City, N. J., has proposed a method for burning anthracite coal dust. It is more particularly designed for locomotives, and consists in throwing the anthracite dust upon a fire started, and to the extent of one-half the fuel required, kept up with bituminous coal. The tender is to be made in two parts for the two kinds of fuel; the fire is to be made at first wholly with the bituminous, and so maintained until the steam gauge shows 100 pounds pressure in the boiler. The anthracite dust is then thrown into the furnace with a shovel in installments alternate with the other.

OLD AND NEW ROADS.

New York & Halifax.

There are rumors that the combination of the Eastern, Maine Central and European & North American companies is to be extended by taking in the Inter-Colonial to the eastward and the New York & New England and its tributary lines to the westward, making, when the latter road shall be completed, a line from Halifax to New York under one control. There is also talk of the Pennsylvania Railroad Company's entering into alliance with this combination, with whose lines it is to make connection over the proposed Poughkeepsie Bridge, in which it has a large interest. Most of this talk, however, is the merest rumor and probably has but little foundation, except as to the lines eastward from Boston. The exciting cause of much of the talk is the fact that the officers of the Pennsylvania Railroad Company have been, in company with Eastern and Maine Central officials, taking a trip of observation from Boston to Halifax.

Cairo & Fulton.

The track is laid to the Little Missouri River and trains are running to that point, which is 27 miles southwest of Arkadelphia, Ark., the late terminus, and 92 miles from Little Rock. Tracklaying is progressing rapidly beyond, and it is thought that trains will run to Fulton by September 1.

Milwaukee & Northern.

The work of grading on the extension of the Menasha Branch from Menasha, Wis., north to Appleton, is to be commenced at once. The extension will be four and one half miles long, and will require some heavy work.

The Delaware Peach Trade.

The peach traffic from Delaware is as yet very small compared with last year, the heaviest shipments sent from Wilmington in one day having been 16 cars to Jersey City and 14 to New York. At this time last year the traffic was almost at its greatest height, 527 car loads having been received in Jersey City during the five days ending August 15. The peach crop is later and the traffic derived from it, which is a matter of considerable importance, promises to be much smaller than that of last year.

Washington City & Point Lookout.

The contracts for the branch line to Alexandria are all let, and work is going rapidly forward. This branch starts from a point just on the borders of the District of Columbia line, opposite Alexandria, passes along the borders of the river, through Uniontown and the eastern part of the District, crossing the Baltimore & Potomac road, thence to Hyattsville, Maryland, where a junction is formed with the track of the Baltimore & Ohio Railroad. This branch, when completed, is to be leased to the Baltimore & Ohio Company, and will serve to connect that road with the Washington City, Virginia Midland & Great Southern, at Alexandria, transfer across the Potomac being made by ferry.

The work of locating the main line from the line of the District of Columbia to Point Lookout has been commenced and the grading will be put under contract as soon as possible. The company has contracted with the Abbott Iron Company, of Baltimore, to furnish 3,000 tons of iron, the delivery of which for the branch road has already been commenced.

St. Paul & Chicago.

Suit has been brought to recover interest on \$100,000 of bonds issued by the city of Winona, Minn., in aid of this road. The city has refused to pay interest on the ground that the bonds were not to have been delivered until the road was completed according to the contract with the city, and that the bonds were fraudulently delivered before the terms of the contract had been fully complied with. It is also claimed that the road had not been completed as agreed, and has not been connected with the La Crosse, Trempealeau & Prescott road by bridge or ferry as the agreement provided.

New Orleans, Mobile & Texas.

The State of Louisiana has brought suit to recover \$750,000 in State bonds issued to this company, and also \$120,000 interest already paid on those bonds. In consideration of the receipt of these bonds the company bound itself to complete a road from New Orleans to the Sabine River in three years, and to Houston, Tex., in six months thereafter. The time has passed and the road is not constructed, and suit is brought to secure the State and prevent the lapsing of its lien on the road.

Erie.

The Chief Engineer, Mr. O. Chanute, asks for proposals for twenty-five iron bridges to be erected along the line of the road. Of these, three are on the Eastern, nine on the Delaware, seven on the Susquehanna, three on the Buffalo and one on the Western Division, and one each on the Newburgh and Hawley branches. Nineteen of these bridges are single span, and of these nine are of 50 feet clear span, or less, and are to be plate girder bridges; the remainder are to be truss bridges. The largest bridges are that at Susquehanna, which has four spans of 110 feet each; that at Corning, which has one span of 173 feet and three of 137 feet each; at Callicoon, where there is a single span of 151 feet; at Lackawaxen, a single span of 129 feet and two spans of 127 feet each; at Salamanca, a single span of 120 feet; at Hawley, one of 190 feet; and at Washingtonville, one of 140 feet. The other truss bridges are of less than 100 feet span.

The Engineer requests that a separate bid be made for each bridge, and the price per lineal foot given. Proposals should also be accompanied by strain sheets and sufficient plans. The company will furnish the lower false works on which trains will run while the new bridge is being put up, will remove the old bridge and furnish and lay the timber floor of the new bridge. All other work must be done by the contractors, who must also pay for the transportation of their material and men over the road.

The proposals are to be opened at noon of August 25, and the work let as soon as the bids can be compared.

Railroads in Chili.

Late advices from Chili state that a measure was before the Congress of that country authorizing the Government to purchase \$2,700,000 worth of railroad material in England for the

Santiago Railroad. Another measure for a line from Concepcion to Lotus was also under consideration.

Harlem River & Portchester.

It is stated that 500 tons of steel rails have been received from Europe for this road. Two construction trains and a large force of laborers are now employed on the work, and an additional construction train will be placed on the road this week. Both tracks, it is expected, will be laid and in running order by October 1, by which time some alterations and improvements to the draw-bridge at Pelham Bay will be completed. It was at first contemplated to commence operations with a single track and open the road by September 1, but the recent determination to complete both tracks before opening the road will delay that event about one month.

The New York, New Haven & Hartford Company is to lease and operate the road.

Salt Lake & Western.

There is talk in Utah of building a railroad from Salt Lake City westward through Utah and nearly parallel to the Central Pacific, out from 100 to 125 miles south of that road. Such a line, it is claimed, could be built more cheaply than the Central Pacific and would pass through some of the principal mining districts of Nevada, besides drawing to it all the trade of Southwestern Utah and Southern Nevada. It is claimed also that such a road could be continued into California, making the line from Salt Lake to San Francisco nearly 100 miles shorter than at present.

Rochester & State Line.

There is talk of an extension of this road (which is now under construction from Rochester, N. Y., to Salamanca) from the latter point southwestward into the oil country of Pennsylvania. The line which seems to be most favored runs from Salamanca down the Allegheny Valley to Warren, Pa., 40 miles. Nothing definite can be decided, however, until the New York section of the line is completed. The work on the line is now so well advanced that it is thought the road will be completed this year.

Middlesex & Burlington.

Articles of association have been filed with the Secretary of State of New Jersey by a company which proposes building a railroad from some point in the township of South Amboy, Middlesex County, to a point in Mansfield or Bordentown, in Burlington County, a distance of 84 miles. The capital stock is to be \$500,000. The road would be parallel and close to the Camden & Amboy.

Atlantic, Tennessee & Ohio.

This road, which extends from Charlotte, N. C., northward to Statesville, 47 miles, has passed into the hands of a receiver. Mr. J. J. Gormley, Superintendent of the road, has been appointed receiver, temporarily, until a permanent appointment can be made, and continues to operate the road.

Seattle & Walla Walla.

A company has been organized to build a railroad from Seattle, W. T., southwest some 200 miles to Walla Walla, Oregon. The capital stock is to be \$10,000,000. The town of Seattle is to give the company a large donation in land.

Middlesex Central.

This road was formally opened for travel August 4. It is operated by the Boston & Lowell Company, which has leased the road for a term of 30 years at a rental of 6 per cent. on the cost (\$250,000) with the privilege of purchasing the road at the expiration of the lease. The road is eight miles long and forms an extension of the Lexington & Arlington Branch of the Boston & Lowell westward from Lexington, Mass., to Concord. It is said that the line will shortly be extended northwest to Groton, with the intention of carrying it finally to Fitchburg, thus giving the Lowell company a connection with the Vermont & Massachusetts and a line to the Hoosac Tunnel.

Milwaukee & St. Louis Air Line.

Meetings have been held in Milwaukee in aid of this project. The Milwaukee & Northern Illinois and the Fox River Valley railroad companies have made an agreement for consolidation under the above title, and propose to build a railroad from Milwaukee southwest to Varna, Ill., where connection is to be made with the Jacksonville Division of the Chicago & Alton. The length of the line from Milwaukee to Varna is 156 miles. It is claimed that the road can be very cheaply constructed.

Michigan Central.

A large force is at work lowering and regrading the tracks at the junction of the Main and Air Lines near Jackson, Mich. The grading of the second track from Jackson east to Michigan Centre, four miles, is nearly completed, and iron is to be laid at once.

The car shops of the company are to be removed to the Junction and grading for the shops has already been commenced. The new shops are to be of brick and very extensive. It is stated that 800 men will be employed.

New Haven, Middletown & Willimantic.

The Connecticut Railroad Commissioners have given the company permission to run passenger trains over the new portion of the road at a speed of 20 miles an hour.

It is stated that an offer has been made to furnish the company with all the rolling stock required on easy terms. The first regular train from New Haven to Willimantic, over this road, ran August 12. There is one daily train now.

Columbus, Chicago & Indiana Central.

It is stated that an arrangement has been made between this company and the lessees of the road, the Pittsburgh, Cincinnati & St. Louis Company, for providing additional equipment and rolling stock to meet the increasing traffic with both the old and new roads at the western terminus. The company has begun a new arrangement with the Columbus & Hocking Valley road for carrying coal, which it is expected will add largely to the business and earnings of the road.

McMinnville & Manchester.

This company has refused to carry the mails any longer, and in so doing has raised a question of some importance. The road is one of those held by the Government at the close of the war, and which the Government provided with rolling stock and turned over to the stockholders on certain conditions. A condition of the release was that they should permit the Government to retain the mail pay until the debt was liquidated. This has been done in every instance—the Post Office Department placing the quarterly mail pay to the credit of the Quartermaster-General on account of payment for the rolling stock. Recently the McMinnville & Manchester road has changed ownership, and the new proprietors have refused to carry the mails unless the mail pay should be paid directly to them, and not retained to the credit of the Quartermaster-General. The Post Office Department has declined to comply with this demand, and the mails have been thrown off. The Government has not yet received pay for its rolling stock, and is obliged to seek some other means than the railroad for the transportation of the mails.

The road is 34 miles long from Tullahoma, Tenn., on the Nashville & Chattanooga road, northeast to McMinnville.

Milwaukee & St. Paul.

The La Crosse (Wis.) *Republican* and *Leader* of August 9, says: "We noticed some days since that John Lawler, of Prairie du Chien, had taken a contract for putting in a pontoon bridge

across the Mississippi between that place and McGregor, for the St. Paul Company. Now we learn the pontoons are to be 300 feet long, and so arranged as to be swung out of the way to let boats and rafts pass. It is expected, if successful, this will do away with all other bridges, and it is claimed it is much cheaper, and as easily managed."

Chippewa Falls & Western.

This company has asked Chippewa County, Wis., to take \$75,000 of the stock of the company and issue bonds in payment thereof. An election is to be held on the question.

New Mail Route.

An extension of mail service has been ordered over the Cairo & Fulton Railroad from Argenta, Ark. (opposite Little Rock), to Arkadelphia, 65 miles. Compensation not determined.

Atchison Bridge.

This company has asked the city of Atchison, Kan., to subscribe \$100,000 to the stock and issue city bonds in payment of the subscription. Atchison papers say that there is considerable opposition to the issue of the bonds.

Providence & Springfield.

Traffic are to be put on at once from Providence, R. I., to Pascoag, 22 miles. In this distance there are 14 stations. The company now owns two locomotives, three passenger and 15 freight cars.

Penobscot Bay & River.

A meeting of committees from the towns holding stock in the Knox & Lincoln Railroad Company is to be held in Rockland, Me., August 18, to consider the question of extending aid to the Penobscot Bay & River road.

It is reported that the contract for the construction of the road had been let to a New York Construction Company for \$30,000 per mile.

The Boston & Maine and Maine Central Controversy.

The employees of the Boston & Maine Company, pursuant to notice, made an attempt at Portland, Me., August 7, to cut the Maine Central tracks for the purpose of putting in connection with their own road. The attempt was formally resisted by the Maine Central people and was at once abandoned, the purpose in making the attempt having been merely to make the necessary points for a lawsuit. The case is to be taken to the courts at once.

Burlington & Southwestern.

A shipment of 500 tons of iron for this road has been received.

Trouble has arisen between this company and the St. Louis, Kansas City & Northern, whose track it uses from Bloomfield, Ia., to Moulton, 14 miles. Owing to some difficulty, stated to be the failure of the Burlington & Southwestern Company to fulfill its part of the contract, the St. Louis, Kansas City & Northern Company, August 2, took up the connections and refused to allow the trains of the other road to pass. As all but one of the Burlington & Southwestern engines happened to be west of Moulton, this step has for a time put a stop to travel over the road.

Iowa Southwestern.

The Davenport (Ia.) *Gazette* says: "Mr. F. E. Hinckley, the contractor, has made a proposition to the Joliet Iron Works for iron to lay two sections of the road, as follows: From Clinton southwest to a point on the Davenport & St. Paul Railway in Scott County, which will afford a connection with that line and a consequent outlet from Clinton to Davenport; and between Lenox—the proposed crossing of the Southwestern and the Burlington, Cedar Rapids & Minnesota—and Iowa City."

The first section is about 25 and the second about eight miles long, leaving a gap of some 40 miles between the two.

Texas Railroads.

A correspondent of the Galveston (Tex.) *News* makes the following statement: "The pecuniary results of railroad building in Texas do not look very brilliant when we look at the fact that as yet no dividend has been received on any original railroad stock in the State, and at the further fact that in the case of the Houston Tap & Brazoria, the Galveston, Houston & Henderson, and the Galveston, Harrisburg & San Antonio railroad companies, the original stock has been wholly valueless. Except, however, when failure was the result of the ruin and wreck consequent upon the war, these companies have been able to satisfy all the claims of their creditors, and their roads now are in a fair way soon to give remunerative returns to their new owners. The enterprises commenced since the war have met with better fortune. The stock of the Houston & Great Northern and of the International railroad companies is in the hands of its original subscribers; the roads, are, despite their incomplete state, earning more than their expenses, and will soon be in a condition to make some return to their builders. What the full value of this return will be can only be ascertained by the experience of the coming fall. It is quite safe to predict that it will prove extremely satisfactory to the bondholders, but that the stockholders will have to wait some years before any considerable dividends will reward their enterprise. In this they will only share the fate common to all American railroad stockholders, the average return upon whose investments is somewhat under 5 per cent. Such a result should not be regarded as by any means disheartening, but simply as teaching that in railroad matters our State possesses no golden secret, and that Texas enterprises must conform to the well-ascertained conditions of success."

In another letter the same correspondent says:

"Two other sources of revenue remain for consideration—sales of town lots and the lands received from the state. On the sales of town lots, on the Central, been considerable. On all other Texas roads they have so far been unimportant; but with the completion of the various roads these sales will increase, and become a valuable additional source of revenue. This item should, in future, be included in returns made to the State.

"The State land subsidy has thus far been only an expense to the companies that have received the whole grant of sixteen sections, or 10,240 acres per mile. Very few of the certificates have been sold to third parties—only 28 by the Central and about 100 by the Great Northern—and not one acre of the lands located has yet been disposed of by these companies. The cost to a company of the location of each section it receives, including the location of the alternate section for the State, is about \$75. These lands will in time become marketable, and this certain prospective value renders them serviceable as the basis for a mortgage bond running, say twenty years; but the failure of the State to issue promptly its certificates to the Houston & Great Northern Company made them valueless to the company for this important purpose. For some years this State aid will continue to be a cost to the companies receiving it. It will involve other expenses, also, in compelling the companies to establish immigration agencies."

Brownsville & Youghiogheny.

Surveys are to be made at once for this road. Three lines are to be run; one from Brownsville, Pa., by way of Redstone Creek, Butte's and Dickinson runs, to East Liberty, a short distance below Connellsville, and thence up the Youghiogheny to New Haven, with a spur to Uniontown, or probably to cross at Dawson's station, by way of Jimtown, to Fountain Mills; another from Brownsville up Redstone to Cook's Mills, then up Crabapple to Perryopolis, Smith's Mills, six miles above West

Newton, and thence to Greensburg; and a third from Brownsville up Redstone and Crabapple to Layton's Station, on the Pittsburgh, Washington & Baltimore.

Wilmington & Reading.

Several new locomotives and a number of new freight cars have been ordered for this road. The work on the extension from Birdsboro to Reading is progressing steadily, and is to be completed this fall.

South Mountain & Boston.

At a meeting of the directors at Blairstown, N. J., August 5, the Chief Engineer made a report of the location of the road from Columbia to Stillwater, a distance of 15 miles, and a resolution was adopted to put it under contract as soon as the estimates can be made, which will probably be within twenty or thirty days. The Engineer also reported that the whole distance from Columbia to the New York State line was about 38 miles, with no grades exceeding 26 feet to the mile.

It is stated that arrangements have been made for a connection with the projected Lehigh & Eastern road from Hazleton, Pa.

Chicago & Northern Pacific Air Line.

The Elkhorn (Wis.) *Independent* of July 31 says: "Four carloads of iron arrived at Springfield for the Air Line Railroad yesterday. The first rails of new track were laid at Geneva last eve."

Galveston, Harrisburg & San Antonio.

A survey has been made as far as Gonzales, Texas, which is some 15 miles beyond the terminus of the section now under contract. The line to Gonzales is nearly at right angles to the general course of the road.

Mississippi Valley & Western.

The whole line of the road from Hannibal, Mo., to Louisiana is now under contract. Track-laying between West Quincy and Hannibal was to have been commenced August 10.

Atlantic & Pacific.

The election of Col. Thomas A. Scott to the presidency of this company and of Messrs. Scott, J. Edgar Thomson and A. L. Dennis to the board of directors is supposed to indicate the truth of the reports that the road, instead of being carried through to the Pacific as originally intended, is to be turned southward, and to form a junction with the Texas & Pacific.

The board of supervisors of Santa Barbara County, Cal., have ordered an election on a proposition to grant this company, or a local company, \$200,000 for a line to the Soledad Pass.

The company proposes to go into the tree planting business, and has ordered a large number of young locust trees to be set out along the line of the road in Southwestern Missouri.

Valley of Virginia.

The work of grading between Staunton, Va., and Harrisonburg is progressing rapidly, and it is stated that nearly three-quarters of the grading is done. The masonry for the bridge over Middle River, six miles north of Staunton, is completed and ready for the superstructure.

South Branch.

A company has been organized under the general railroad law to extend this road from its present terminus at Flemington, N. J., westward to the Delaware River, a distance of about 12 miles. The road now extends from Somerville southwest 16 miles to Flemington, and is leased by the New Jersey Central.

Rutland & Montpelier.

Arrangements are being made for the preliminary survey of this projected road, which, we believe, is to be of narrow gauge, and is to extend from Rutland, Vt., north to Montpelier, about 50 miles.

Central, of Iowa.

This company is again seeking subscriptions in St. Louis for the building of 27½ miles of road from the southern terminus of the road at Albia, Ia., south to the St. Louis, Kansas City & Northern at Moulton. At present the connection with the latter road is over the Des Moines Valley from Eddyville to Ottumwa. The St. Louis people are asked to take \$200,000 in preferred stock, which is offered at 72. Meanwhile the company has been unable to pay the interest on its bonds last due.

Davenport & St. Paul.

Suit was recently commenced against this company by the city of Davenport, Ia., and an *ex parte* injunction obtained to prevent the laying of the track into the city. A hearing of the case was subsequently had, when the judge directed that the injunction should stand until a further hearing of the case before the Chief Justice. At the same time another injunction was granted, prohibiting the city authorities from any forcible interference with the company.

Dividends.

The Lehigh Valley Railroad Company, lessee, paid the regular semi-annual dividend on the stock of the Morris Canal Company, August 5.

The Chicago, Burlington & Quincy Railroad Company has declared a dividend of \$5 per share, payable September 15. The transfer books will be closed from August 23 to September 18.

Montreal, Chambly & Sorel.

The first section of this road is completed from St. Lambert, Quebec, southeast to Chambly, a distance of about 12 miles, and a train has been run over the line. St. Lambert is on the Grand Trunk road, seven miles east of Montreal.

Portland & Ogdensburg—Vermont Division.

The St. Johnsbury (Vt.) *Caledonian*, of recent date, says:

"On Tuesday of last week, Chauncey and Harrison Warner, of Cambridge, paid over to the directors of the Vermont Division Portland & Ogdensburg Railroad \$4,000 as a free gift. Some five years ago, when this railroad project was first inaugurated, these men said to the directors that when satisfied that the enterprise was to be a success, they would give the company \$2,000 each, and Tuesday they came forward and made good their verbal promise."

Toronto & Nipissing.

The annual meeting of this company is to be held in Toronto, Ont., September 9, at the office of the company.

Union Pacific.

The Land Department reports sales made during the month of July of 20,599.43 acres for \$138,677.23, being an average price of \$6,732 per acre. The total sales up to August 1, 1873, were 756,644.57 acres for \$3,310,495.53, being an average of \$4,375 per acre. The entire land grant of the company is about 12,000,000 acres. Judge Dandy, of the United States District Court at Omaha, Neb., has granted a preliminary injunction restraining the counties along the line of the road from taxing the lands granted to this company in aid of the building of the road. The injunction is to continue until the final hearing, which will be at the November term of the court.

Mobile & Montgomery.

It is stated that default having been made in the payment of the interest on the \$2,500,000 of mortgage bonds indorsed by the State of Alabama, the property has, in accordance with the terms of the mortgage, passed into the hands of the trustees, P. C. Calhoun and T. H. Potter, of New York, and Josiah Morris, of Montgomery, Ala. The transfer was not resisted. The

bondholders have made no demand on the State for the interest in default, and it is understood that they will make none, preferring to look to the mortgage on the road for indemnity.

Richmond & Danville.

There have been rumors for some time past to the effect that this company would terminate the litigation concerning the lease by it of the North Carolina road and the proposed change of gauge of part of that road, by surrendering the lease. The officers of the Southern Railway Security Company (which controls the Richmond & Danville Company) have denied that there is any intention of surrendering the North Carolina lease, or that such a measure was ever contemplated.

North Shore, of Canada.

The Quebec (Canada) *Chronicle*, of recent date, says:

"We had hoped that, under the last arrangement which was embodied in supplemental contract, between the North Shore Railway Company and the Chicago Contracting Company, by the terms of which the railway company conceded an additional bonus of three million dollars capital stock to the contracting company, the work of construction would be resumed at once. But it seems we are again doomed to disappointment. From information that we consider entirely reliable, it appears that the London Syndicate, which was relied upon to float the bonds of the company, has entirely abandoned the undertaking, and that Messrs. Dunlap and Smith, who represented the contracting company in Europe, have returned to New York for the purpose of increasing the working capital of the contracting company from among their own friends upon this side of the water, to such an extent as to enable them to execute the contract without any present aid from foreign capital. To do this will necessarily occupy considerable time, and it is therefore hardly to be hoped that any considerable amount of work can be executed during the present working season. We understand, however, that the Chief Engineer has been authorized to perfect the location of the line during the present season, so that the difficult and expensive foundations of some of the larger bridges can be put in during the coming winter, when the streams will be covered with ice, and also that the contracting company have made a conditional arrangement for the delivery of a large portion of the iron rails early next season, and also that the cross-ties will be provided in the meantime; so that, if the contractors succeed in making arrangements a general resumption of the work can be effected early next spring."

Springfield & Longmeadow.

This company has made a new proposition to the city of Springfield, Mass. The city is asked to subscribe \$125,000 to the stock and to guarantee the bonds to the amount of \$100,000.

Middlesex & Burlington.

A company has been organized under the New Jersey general railroad law for the purpose of building a railroad from some point in the town of South Amboy in Middlesex County to a point in Mansfield or Bordentown in Burlington County. The road will be about 34 miles long, and the capital stock is to be \$500,000. Such a road would be, for the whole distance, parallel and close to the Camden & Amboy road.

Evansville & Jeffersonville.

A company has been organized to build a narrow-gauge railroad from Evansville, Ind., northeast to Jeffersontown (opposite Louisville, Ky.), a distance of about 100 miles. The capital stock is to be \$3,000,000.

Atlanta & Richmond Air Line.

The work on the gap in this line southwest of Greenville, S. C., is nearly completed. The track-laying is progressing very rapidly and it is intended to lay the last rail some time during the present month.

Illinois, Missouri & Texas.

The road bed is being leveled up and the ties put in place for 29 miles west of Cape Girardeau, Mo., the eastern terminus, and a considerable quantity of iron is on hand. The pile driving for the different bridges is completed and the superstructure of the bridge over the Whitewater is ready to put up. The grading is completed for 41 miles and work is shortly to be resumed and continued until the road reaches Poplar Bluff, on the Arkansas Branch of the St. Louis & Iron Mountain road.

Indianapolis Belt Railway.

Surveys have been made and negotiations are going on for the right of way for this road, which is to extend entirely around the city of Indianapolis, connecting all the roads entering the city and enabling them to make their freight transfers entirely outside of the city. The work of grading and bridge building is to be commenced in a short time, as soon as the right of way is all secured.

The company will soon issue \$1,000,000 of 20-year bonds bearing 8 per cent. interest. It is stated that arrangements have already been made for placing these bonds.

Paris, Rockville & Northeastern.

The Terre Haute (Ind.) *Gazette* says that the contract for this road has been let to E. D. Hervey, of Illinois.

Central, of Georgia.

The Savannah (Ga.) *Advertiser* says that \$1,700,000 of the mortgage bonds offered by this company in connection with the Macon & Western and Southwestern companies have been negotiated in New York at satisfactory rates. The proceeds are to be used in completing the extensions now in progress or proposed and in improving the condition of the existing lines.

Galion, Logansport & Chicago.

It is reported that parties in the interest of the Erie and Atlantic & Great Western are making arrangements for the construction of a line from Galion, O., to Chicago. They have adopted the line of this proposed road in Ohio and that of the Lake Erie & St. Louis in Indiana, which together will form a continuous line from Galion, O., west to Kokomo, Ind. Local aid is asked for along the line. A line, however, running to Kokomo would be pretty far from being a direct line from Galion to Chicago.

Northern Pacific.

A correspondent of the St. Paul (Minn.) *Press*, who is with the Yellowstone Expedition, writes as follows: "The surveys for the Northern Pacific have thus far developed the fact that the present line is altogether the most satisfactory one for a railway of any hitherto examined. Commencing on Heart River opposite Bismarck, the surveys have followed up that stream twelve miles to Sweet River Creek, one of its northern tributaries, thence up that creek a distance of eighteen miles, thence across to a branch of Mud Creek and descending it for five or six miles, thence across the sources of several small creeks known to be tributaries of Heart River, for about twenty miles, thence across to the valley and up a branch of the Big Knife to the second crossing of Heart River, a distance of about 85 miles from the Missouri. From this point the line follows the surveys of 1871, along Heart River and up one of its northern branches to a point about 130 miles west of the Missouri River. At this point the engineers left the Heart River system and six miles farther on they entered the famous Mauaisse Terres by a new line more northerly than any heretofore examined. It is to be recollect ed that the route surveyed in 1871 followed the valley of Heart River throughout nearly its entire length. A glance at a good

[August 16, 1873]

map will show, however, that such a line deflects far to the southward, making it too indirect, while the grades at several points are so heavy as to make it highly objectionable. Linsley's line, surveyed in 1872, contemplated running from the Missouri at Bismarck direct to the Yellowstone, striking that stream at the mouth of Powder River. But by this route the face of the country was so rough that the deflections would actually increase the distance about two miles over the line of 1873 between the two rivers. By the line just surveyed, which may be called Rosser's line, a saving in distance of 23.3 miles is effected over the line of 1871, while the grades all fall below the established maximum for the road, which is 60 feet to the mile going west, and 50 going east. The engineers, under the close personal supervision of General Rosser, have worked most assiduously, doing field duty in the day time and topography during the night."

Cumberland & Ohio.

A large force is to be put at work on the grading of a section 24 miles long from Gallatin, Tenn., northward into Kentucky. It is intended to have this section completed next summer.

Chillicothe & Brunswick.

This road was sold at auction under foreclosure of the first mortgage of \$500,000, in St. Louis, August 8. It was purchased for \$62,500, over the mortgage and over due interest, by Mr. George Rice, acting in behalf of the bondholders.

The road extends from Brunswick, Mo., northwest to Chillicothe, 36½ miles, and is leased and operated by the St. Louis, Kansas City & Northern Company.

Allegheny Valley—Eastern Extension.

The track is laid from the eastern terminus of the Extension (the Pennsylvania low-grade line over the Alleghenies) at Driftwood, Pa., on the Philadelphia & Erie, west by south to Barnes' Station, a distance of 20 miles, and trains commenced running regularly over that section August 5. This makes 62 miles of the Extension on which track is now laid, leaving a gap of 48 miles between the eastern section at Barnes' and the western section at Brookville, on which a large portion of the work is done.

Utah Southern.

Liberal subscriptions are being made to the stock for the extension from Lehi, Utah, southward, and work is shortly to be commenced on the grading from Lehi to Provo.

Lake Erie, Evansville & Southwestern.

The track is laid from Evansville, Ind., northwest to Boonville, a distance of 16 miles, and the first train passed over it August 4.

Kansas City, Memphis & Mobile.

Work was commenced on this road near Kansas City, Mo., August 4.

Ouachita Valley.

This company's line is to extend from the Cairo & Fulton at Arkadelphia, Ark., 65 miles southwest of Little Rock, southward to Camden, a distance of about 40 miles, passing through the cotton section of the State. It is stated that the whole road is under contract, and that 200 men are at work on the grading.

Burlington & Missouri River.

The trains of this company commenced running through to Atchison, Kan., August 5. The tracks of the Wathena & Doniphan and Atchison & Nebraska roads are used from St. Joseph to Atchison.

Peterborough.

The grading and bridging on this new road is so nearly completed that it is thought that the whole line will be ready for the rails by the middle of September. It will form an extension of the Wilton road from Wilton, N. H., west 10 miles to Peterborough.

Richmond & Chesapeake.

A steamer is making regular trips between the York River terminus of this road at West Point, Va., and Baltimore, and a second steamer is soon to be placed on the line.

New York & Oswego Midland.

It has been decided to make Middletown, N. Y., the terminus of the Eastern and Middle divisions of the road, and to build the machine and repair shops of the Eastern Division at that place. This will make the Eastern Division 88 miles long, from Jersey City to Middletown. The people of Middletown had subscribed \$50,000 to secure the location of the shops there.

Flushing & Northside.

The new line from Woodside, N. Y., to Flushing is nearly completed, and will soon be opened for travel. It will shorten somewhat the distance from Hunter's Point to Flushing.

Long Island.

The work on the new branch line from Winfield, N. Y., through Newtown Village to Flushing, is making good progress, and it is expected that it will be completed next month.

The line from New York to Newport by this road to Greenport, and by steamer from Greenport to Newport is said to be doing a fair and increasing business.

Easton & Amboy.

The grading on this road, the Lehigh Valley's line across New Jersey, is making good progress at several points. The work of building docks at Perth Amboy, N. J., has already commenced.

Pennsylvania—New York Division.

Work on the new shops west of the Hackensack River is progressing rapidly. The round house, which is 300 feet in diameter and will hold 45 locomotives, is nearly completed. The three principal shops for the locomotive department are enclosed. These shops cover a space 200 by 175 feet and stand close together. They are to be used as a boiler shop, machine shop and erecting shop. The blacksmith shop, 156 by 120 feet, which will have three steam hammers and about 40 fires, is advancing rapidly, as is the wood machine shop for the car department, which is 135 by 70 feet. There is also a stationary engine house, a drying house for lumber, 40 by 30 feet, a lumber shed, 60 by 100 feet, an iron shed, 60 by 100 feet, an oil house and a sand house. The foundations are laid for a passenger-car shop, 400 by 137 feet, and a paint shop, 110 by 35. The freight-car shop is to be circular in form, 430 feet in diameter. Between the locomotive erecting shop and the car shop is to be a transfer table, the foundation of which is 480 by 60 feet. The buildings are all of brick, with slate roofs, and the foundations are on piles. The ground about the shops, which are on the tract known as the Meadows, is being filled in with gravel brought from the company's land in East Newark.

About a mile from the shops and close to the Hackensack is a large coal dump, reached by side track and trestle work, where a large quantity of coal can be stored. From this dump coal is to be carried across the main track on a light bridge by hand cars to a small dump from which the tenders of the locomotives can be filled.

The space between the main track and the shops is being filled with side tracks to be used for storing and sorting out freight cars, which will be kept there until wanted in Jersey City, when they will be carried in by the shifting engines. The runs of the freight engines will end at the shops.

The trestle-work and street bridges leading to the Harsimus

LOCOMOTIVE RETURNS, APRIL, 1873.

Master Mechanics of all American railroads are invited to send us their monthly reports for this table.

NAME OF ROAD.	MILEAGE.			NO. OF MILES RUN TO	COST PER MILE, IN CENTS, FOR			AVERAGE COST OF OIL, per gallon...
	Passenger.....	Freight.....	Miscellaneous...		Pint of Oil.....	Cord of Wood.....	Repairs.....	
Number of Locomotives in service	Number of miles open							Coal, per ton...
Allegheny Valley.....	56	35,617	102,004	11,260	148,881	38,90	18,30	\$ 6.00 22.63
California Pacific (Western Division).....	148	9	14,367	4,955	3,720	23,052	9,66 10.75	5.00
" (Sacramento Div.).....	173.4	43	38,166	38,585	29,645	49,37	45,52 20,73	5.27 21.10
" " (True Div.).....	119.5	39	12,968	43,052	30,305	88,331	15,21 18,36	4.35 8.81
" " (Humboldt Div.).....	236.6	23	12,484	43,485	10,270	66,115	17,77 15,05	4.35 8.83
" " (Salt Lake Div.).....	182.8	26	11,590	60,132	6,054	70,365	17,38 14,50	4.35 8.83
" " (Oregon Div.).....	151.48	8	9,866	8,375	10,641	19,641	19,45 23,22	4.35 8.83
" " (Visalia Div.).....	146.3	9	9,096	6,410	3,039	12,390	10,08 16,00	4.35 8.83
Chicago, Burlington & Quincy.....	285	88	74,437	89,689	49,918	612,403	37,31 21,51	4.35 8.83
Chicago & N. W. (Wis. & Mil. Div.).....	20	9,238	16,093	11,103	38,484	23,044	19,71 21,71	4.35 8.83
" (Madison Div.).....	44	43,947	82,023	65,423	65,423	107,464	31,08 16,18	4.35 8.83
" (Galena Div.).....	75	44,175	73,859	37,377	155,406	39,75	34,46 18,12	4.35 8.83
" (Mil. W. Div.).....	207	54	24,399	19,9 0	12,634	43,92	14,94 10,61	4.35 8.83
Cleve., Col., Cin., & Ind. (Ind. Div.).....	133	58	25,689	112,539	30,125	20,430	17,77 16,12	4.35 8.83
" (Col. Div.).....	130	26	20,990	26,635	20,003	19,760	18,26 11,58	4.35 8.83
Cleveland & Pittsburgh.....	82	5,566	5,520	3,000	15,08	27,215	19,62 16,12	4.35 8.83
Denver Pacific.....	67	47,310	81,257	13,197	19,714	46,00	19,37 7,49	4.35 8.83
Illinois Central (Chicago Division).....	252.5	66	46,466	66,144	33,621	146,231	37,07 17,02	4.35 8.83
" (South Division).....	230.75	35	25,714	44,401	11,609	81,724	12,47 12,73	4.35 8.83
" (North Division).....	401	42	28,005	65,891	17,493	107,464	10,52 15,00	4.35 8.83
Kansas Pacific.....	103	88	60,943	69,514	41,355	192,639	35,77 12,20	4.35 8.83
Lackawanna & Bloomsburg.....	80	25	12,590	22,709	17,473	37,08	15,18 11,36	4.35 8.83
Lake Sh. & Mich. Sou. (Buffalo Div.) ^a	33	24,172	121,745	70,000	21,177	59,73	11,78 11,78	4.35 8.83
" (Erie Div.) ^a	97	31,929	162,750	59,560	202,239	45,63 43,85	10,34 10,34	4.35 8.83
" (Toledo Div.) ^a	74	41,246	135,698	37,000	213,944	51,53 52,53	14,63 14,63	4.35 8.83
" (Mi. So. Div.) ^a	178	123,300	251,549	190,638	573,497	34,51 45,51	7,71 4,65	4.35 8.83
Leavenworth, Lawrence & Galveston.....	15	17,369	18,127	3,466	39,962	61,03	26,01 2,02	4.35 8.83
Maine Central.....	376	80	57,112	99,471	6,490	135,073	10,70 8,14	4.35 8.83
" (Memphis Div.) ^a	253.8	31	19,503	33,235	4,968	33,92	10,00 8,62	4.35 8.83
" (Decatur Div.) ^a	122	22	17,170	21,304	2,239	40,793	10,05 13,60	4.35 8.83
" (S. & N. A. Ia. Div.) ^a	32	17	32,960	40,313	7,690	61,951	11,10 8,14	4.35 8.83
Marquette, Houghton & Ontonagon.....	17	5,493	7,500	29,994	90,221	10,20 19,23	16,60 1,00	4.35 8.83
Pennsylvania (New York Division).....	119.9	117	150,872	129,555	10,025	290,452	34,40 13,86	4.35 8.83
" (Amboy Division).....	154.2	63	50,577	60,161	5,165	115,903	51,71 51,35	4.35 8.83
" (Belvidere Division).....	84.6	37	20,746	38,239	7,931	66,916	37,45 12,02	4.35 8.83
" (Pitts. Div.) ^a	114.3	43	71,973	321,340	12,049	405,457	50,68 17,12	4.35 8.83
" (Middle Division).....	131.6	123	59,198	304,989	13,247	377,422	20,02 19,31	4.35 8.83
" (Pitts. Div., E. End.) ^a	77	10	10,000	30,000	3,329	24,32	10,96 8,50	4.35 8.83
" (Pitts. Div., W. End.) ^a	123	69,346	212,575	35,434	291,375	32,39	14,37 7,30	4.35 8.83
" (Tyrone Division).....	100.3	29	11,132	34,922	2,242	23,59	10,39 8,00	4.35 8.83
" (West Penn's Div.) ^a	103.6	29	24,486	43,350	2,722	67,270	35,04 26,31	4.35 8.83
" (Lewistown Division).....	62.5	14	7,261	8,318	1,154	16,733	13,43 13,30	4.35 8.83
" (Bedford Division).....	45	7	4,472	6,479	1,869	12,759	58,36 16,02	4.35 8.83
Pitts., Ft. Wayne & Chic. (E. Div.) ^a	319.2	160	79,778	345,296	111,375	436,649	37,62 12,22	4.35 8.83
Pitts., Cin. & St. L. (Lit. Miami Div.) ^a	280	104	82,784	214,161	20,181	317,671	30,40 22,10	15,20 6,00
Pitts., Cin. & St. L. (Lit. Miami Div.) ^a	41	50,696	43,093	3,155	16,944	44,70	10,15 4,10	8,00 1,00
South Carolina.....	242	36	15,289	47,537	12,300	75,126	40,92 30,30	4.48 6,40

* Switching Engines allowed six miles per hour.

† 0.01 lbs. sand used per mile run.

docks are making rapid progress through Jersey City. The contractors are also at work on the rock cutting through Bergen Hill for the new freight tracks. This work is necessarily slow, as the cutting is in a very hard trap rock and only a limited number of men can be employed at one time. The work on the docks in Harsimus Cove is making good progress.

Work on the new depot in Jersey City is progressing rapidly. The present depot is 300 by 100 feet and has five tracks. The new depot will be 600 feet long, exclusive of restaurant and ferries, and will be 156 feet wide, with eight tracks and five platforms, 16 and 18 feet wide. The depot will be built in three spans, one eighty-four feet and the others thirty-six feet wide each. In the middle span the peak of the roof will be forty feet from the tracks, and the side spans will be thirty-six feet wide. Along the center of each span will be a ventilator. The roof will be perforated with many skylights and the roof of the ventilators will be entirely of glass. The sides of the latter will be lattice work. On the north side of the depot proper will be erected two spans of thirty-six feet each, with two tracks in each, to be used for standing cars and wash house. The south wall of the new structure will follow the line of the south wall of the present depot, and the west end will be about 150 feet from Green street. The platforms in the depot proper will be of concrete, and the tracks will be planed throughout. On the east end of the tracks will be a passage way of thirty feet, for passengers' use. East of this will be a waiting room, 100 by 48 feet, opening into a ladies' waiting room, restaurant, ticket office, water closets, etc. This place will be handsomely finished. East of this again will be a forty foot street for ferry travel. The ferry slips or bridges will extend 100 feet farther into the river than they do now, and the piers will extend out as far as the law allows. There will be six ferry slips where there are now four. New ferry-houses, waiting-rooms, etc., will be built. The new depot, exclusive of ferry-houses, will cover four acres of ground. The rafters of